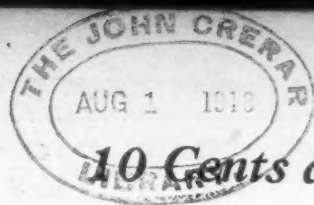


March, 1918

Green's



AMERICAN FRUIT GROWER

Edited by Samuel Adams



The National Fruit Journal of America

J.H. Hale Peach Trees

From Stark Bro's

Yielding Record Crops Everywhere

THE shrewd, far-sighted orchardist or the man who wants to raise the finest peaches in his back yard, buys genuine J. H. Hale trees from Stark Bro's Nurseries at Louisiana, Mo.—the real home of Stark Trees.

America's fruit growers are today picking fortunes off genuine J. H. Hale trees from Stark Bro's Nurseries.

We grew our first 13,000 J. H. Hale Trees in 1911-12! That was years before the J. H. Hale peach was known to orchardists generally. These trees were sold to the late Mr. J. H. Hale, the Peach King of America.

We have repeatedly advised our customers to plant genuine J. H. Hale Peach Trees. We are even more enthusiastically urging big and little orchardists to plant J. H. Hale Peach Trees this Spring.

No other peach has made such a tremendous sensation as the J. H. Hale. It is truly the king of all peaches in appearance. Huge in size. Ruddy streaked golden globes, enveloped in blushing velvet. Its firm golden flesh is tender—dripping with a honey-tart lusciousness that once tasted is never to be forgotten. It is larger, handsomer, better flavored, much hardier in tree and bud and far better shipper than the old Elberta.

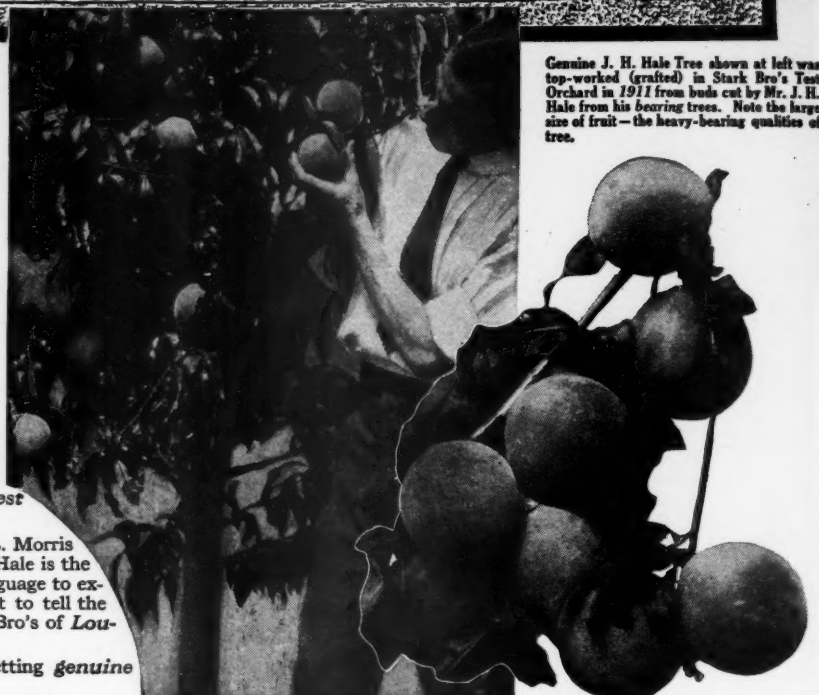
Genuine Stark Trees Bear Young

Furthermore, the genuine J. H. Hale Trees from Stark Bro's Nurseries have proved wonderfully young bearers. F. H. Davis of Amador Co., who bought J. H. Hale trees from us, writes: "My largest tree, at 20 months from planting, ripened one hundred and twelve fine peaches. Everybody who saw them said they were the finest they

ever saw. Of all the peach trees I believe the J. H. Hale trees are the earliest heavy bearers."

Another one of our customers, Dr. E. L. Morris of Moscow, Tenn., writes: "The J. H. Hale is the king of all peaches. I haven't the language to express the beauty of this peach. I want to tell the world that the trees came from Stark Bro's of Louisiana, Mo."

Dr. Morris profited by insisting on getting genuine Stark Trees which come only from—



Genuine J. H. Hale Tree shown at left was top-worked (grafted) in Stark Bro's Test Orchard in 1911 from buds cut by Mr. J. H. Hale from his bearing trees. Note the large size of fruit—the heavy-bearing qualities of tree.

Stark Bro's Nurseries

At LOUISIANA, MO., For 102 Years—Since 1816

Plant Stark Trees This Spring With Quick War Crops Between the Rows

Dr. J. C. Whitten, Dean of Horticulture, and Orchardist, Missouri Agricultural College, says: "There never was a time when orchardists could put out an orchard with as fine an outlook for profits as now. I am urging owners of land to plant orchards and to plant this spring because of the opportunity to plant war crops between the rows. The land will be made to produce good profits until the trees begin

to bear. An orchard yields the most profitable crop of any farm product."

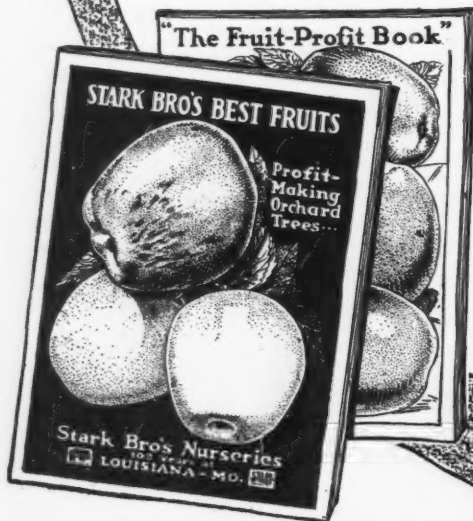
Herbert Hoover Says: "I look upon fruit as very essential during the war. The more fruit and vegetables used the better the health of the public. The Food Administration is doing all in its power to promote their use among consumers."

You can get splendid prices for all the corn, beans, potatoes, berries and all quick crops you grow between the rows. At the Missouri State University last summer navy beans in a young orchard yielded 20 bushels to the acre. That, at \$9.00 per bushel, meant a between-the-row crop profit of \$180.00 per acre!

A former student of this agricultural college bought 40

acres of land. He used 20 acres for orchard and rented the other 20 as pasture. He grew quick crops, including some strawberries, between the rows while the trees were growing. In 8 years his between-the-row crops alone had paid for the orchard and paid him 12 per cent clear profit in his entire investment. What's more, the orchard has borne fruit for the last 8 years and has netted him \$1500.00 to \$2000.00 additional profit each year, with all labor hired! 1917 crops brought \$3600.00. This should show you what you can do with a planting of genuine Stark Trees from Louisiana, Mo. Thousands of farmers, fruit-growers, owners of homes with back-yard space are following this plan. You can do it yourself—in as small or as big a way as you choose.

"The Fruit-Profit Book"



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Get posted on the genuine Stark Bro's Fruit Trees—the famous Stark Delicious, the great red apple that is "The Money Maker of the Orchard"—the latest Stark Bro's fruit development, Golden Delicious, New Queen Of All Yellow Apples. J. H. Hale and Stark Early Elberta Peaches, and all the other apples, peaches, pears, plums, quinces, apricots, cherries, berries, grapes, etc., that are so splendidly propagated at these 102-year-old nurseries at Louisiana, Mo.

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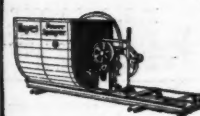
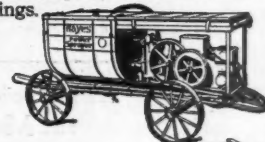
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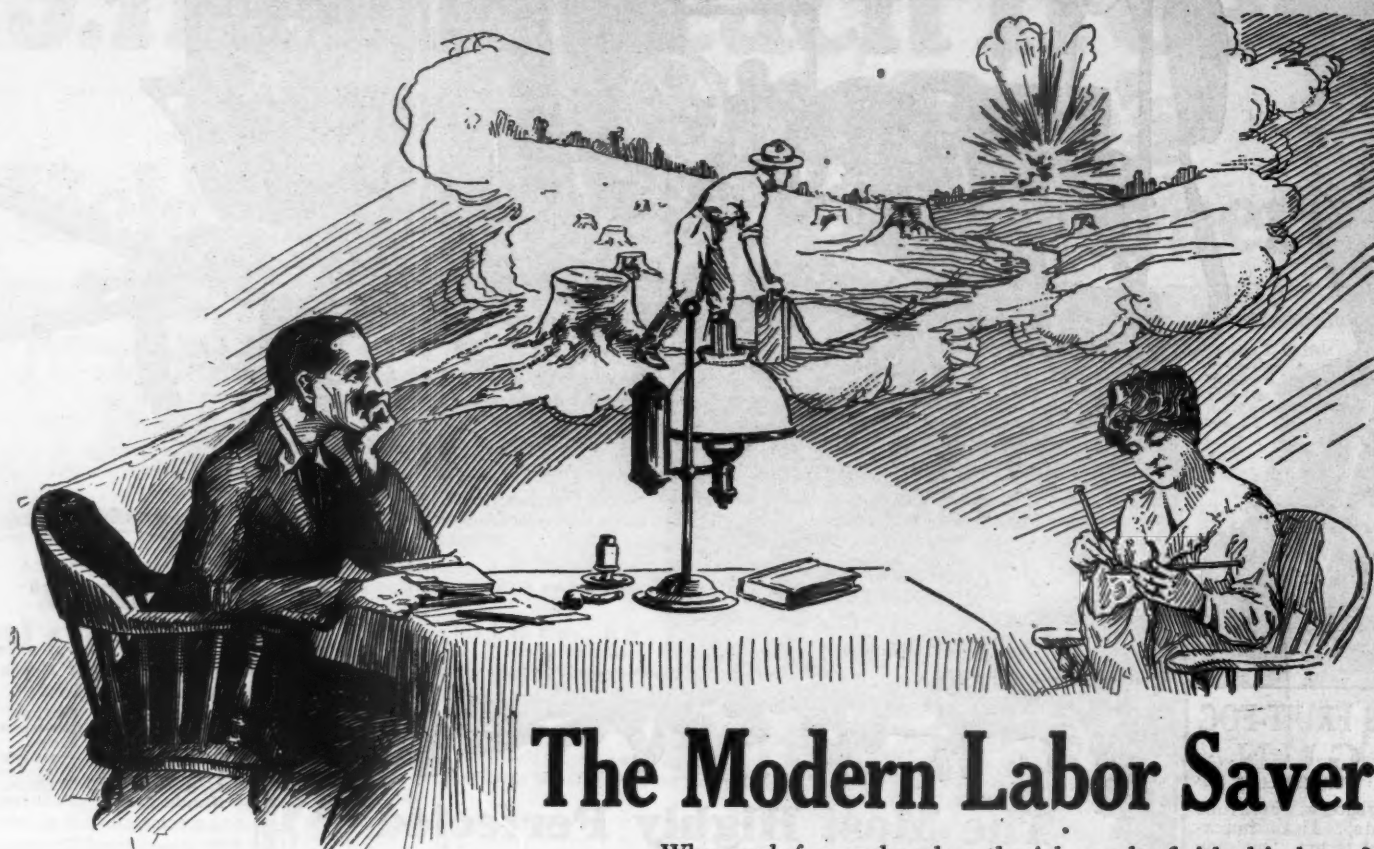
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Green's American Fruit Grower

A Monthly Magazine Devoted to Fruit Growing and Marketing

VOL. XXXVIII

MARCH, 1918

No. 3

Maintaining Proper Vigor in Fruit Trees

Address Delivered by Prof. C. I. Lewis, Oregon State Agricultural College, at the Indiana State Horticultural Society

THERE is no question of greater importance to the orchardist than the proper vigor of trees. The matter of vigor is really a relative one. The type of vigor desired in a tree three years of age might not be the type of vigor desired in one eight or ten years of age or even much older. To give my ideas on the proper vigor of fruit trees, it will be necessary to consider this question from the viewpoint of age of trees, on the one hand, and of the contributing factors which influence vigor on the other.

Three Classes Treated

I prefer, in treating this subject, to divide the trees of the orchard into three classes. First, trees from one to about five years of age, which are in what we will call the formative period. Second, those trees from five to eight years of age, or even a little older, which are passing from the body building or formative stage, into the fruiting stage. This class belongs to the critical, or transition period. The third class consists of those trees which have reached heavy bearing and includes trees from eight to ten years of age, or older.

We will first treat of the formative period. This period is one in which we desire a very sturdy, stocky growth of the trees. Orchards at this age should be given intensive tillage. It is desirable to have this tillage begin as early in the spring as the ground can be conveniently worked, and to give frequent stirrings of the ground until about the middle of July or until such time as the trees have made a desirable terminal growth. The tillage should then cease, to a large extent, and the trees be allowed to thicken their branches and become hardened for the winter.

We can divide the food in the tree into two classes. First, the raw sap or mineral food, which comes up from the roots into the leaves; and, second, the elaborated food, which is manufactured by the leaves. The leaves take the raw food received from the roots and combine it with the gases obtained from the air, manufacturing concentrated foods, such as starches and sugars.

In early spring there is a large amount of sap being taken into the tree. The leaf area at this time is small and it is noted that the tendency of the tree to make a shoot growth is pronounced and that a stimulation at this time tends to produce additional shoot growth. After the leaves have expanded fully and the sap supply is somewhat reduced, the elaborated food manufactured in the leaves becomes relatively more abundant; the trees now show less tendency to make terminal growth, but more to increase the diameter of their branches and to store food.

Best Intercrops

Should it be desired to intercrop the orchard at this age, the crops had better be early truck crops or berries, such as strawberries, which need the same intensive spring and early summer tillage as the trees require. Grain or hay crops, if they come close to the trees, may, under many conditions at least, retard the growth of the trees and may even stunt them. Under normal conditions, little fertilization should be required, but if the trees are not making satisfactory growth, then one is justified in feeding the trees.

Pruning Young Trees

In pruning such young trees there are several points we wish to keep thoroughly in mind. First, the trees should be so headed as to give a good spacing of

branches and thus avoid weak crotches. Second, the main branches of the trees should be kept at about equal vigor. This is done by cutting back and reducing the leaf area on the more vigorous branches, thus giving the weaker branches a larger proportion of the food. Third, we should constantly try to avoid weak forks. This is brought about by avoiding equal cutting, and where two branches form a union, we should rather cut so that one branch is longer than the other. The shortened branch thus becomes a lateral of the longer branch and one avoids in this way the weak U- or V-shaped crotches which otherwise will become very prevalent.

Pruning Older Trees

During the first three years of a tree's life we are very anxious to secure a good, stocky, vigorous growth. This is brought about by heavy winter pruning, it being necessary each year to cut back vigorously the growth of the previous year. By the time the trees are from three to five years of age a certain amount of summer pruning can often be given to great advantage, this pruning to be done in the middle of June or even up to the middle of July, at a time when the branches have made a desirable terminal growth. Heading back and some thinning out at this time will enable one to gain a year in the formation of certain laterals and will encourage the formation of fruit spurs on the older wood, thus gaining both body building and a tendency to fruit earlier.

Trees from one to five years of age should be so handled as to give a vigorous growth. If this cannot be secured by the methods already described, a stimulation by the use of manures, cover crops or fertilizers, may be desirable.

By the time the trees have reached the transition period, which is from five to eight years of age, we should have built up a sufficiently strong body for the trees to begin to bear fruit to advantage, and our methods of handling the trees as regards tillage, fertilizing and pruning should be such as to discourage the growth of extremely vigorous wood, and rather to encourage the formation of thick, sturdy growth. That is, the diameter rather than the length, should increase, thus allowing

the elaborated foods to accumulate, as these foods seem to be necessary at this stage of the trees' development to encourage the formation of fruit buds. Anything given to the trees at this time which tends to stimulate a rank wood growth, encouraging more raw food or sap, so to speak, will simply delay the period of fruiting.

Checking Growth

Where the trees are very vigorous, the tillage should be greatly reduced; perhaps none at all given for at least a year, and in some cases the growing of a grain crop among the trees would be highly desirable. The pruning should consist of more thinning out, rather than so much heading back, and it would be well to distribute the pruning over two periods, some thinning out in June or July and an additional thinning out in late winter.

I would urge caution in this practice, however, because while it is very good for a year or two, if carried out for a series of years it may simply force the fruit of the trees to the top and outside and lead to a condition of the trees which may be difficult to correct satisfactorily. We wish, however, to avoid the heavy cutting back which was desirable in the younger trees. Should it seem absolutely essential to remove some of the terminal growth; this might be done to advantage at about the time the trees are ceasing their active terminal growth in the summer time.

Where we practice thinning more than heading we are encouraging the development of branches well supplied with food and are allowing for good air circulation and plenty of light for the best spur development. Should one find that the trees are bearing considerable fruit at this period, unless care is exercised in keeping the growth from becoming too rank the fruit is apt to be large, poorly colored and subject to fruit pit.

The Bearing Period

When our trees have reached the third period, namely, that of heavy bearing, we must again study the interrelation of pruning, tillage, fertilizing and intercropping, and their influence on the type of tree we are anxious to maintain. The formation

of regular, heavy crops of fruit is a drain on the trees and such a drain must constantly be met. Again, the tillage must be intensive as it was during the first period, and early spring plowing, harrowing and stirring of the ground at intervals should be practiced, so that moisture may be maintained up to the time of harvesting in the fall. Should one prefer a mulching system to tillage, well and good. The point is to handle the trees so that they do not suffer for want of moisture.

The role of moisture is a very important one. I realize that perhaps we cannot segregate moisture and food, as they go hand in hand, yet let us consider moisture for the moment as the fluctuating factor. Where the tree has plenty of moisture, the color of the fruit tends to be bright, lively and attractive; the size of the fruit is large and tends to be oblong in form; the buds are strong and abundant; the twig growth is satisfactory; the leaves are large and green, and there are but few culls caused by too small size, a cracking around the stem and calyx, or a premature dropping of fruit.

Where the trees suffer from the want of moisture, the color is dull and unattractive; the fruit tends to be flat and smooth; the buds are often weak so that next season's crop is greatly reduced; the twig growth is often unsatisfactory and the leaves turn yellow; and the number of culls is greatly increased. The lack of moisture during late summer or early fall with the tree which is heavily loaded with fruit is very serious, and may lead to complications which will take a number of years to overcome.

Providing Nitrogen

Plenty of plant food at this time is very essential. The element which seems to be lacking in most of the orchards is that of nitrogen. The restoring of nitrogen to the soil often produces marvelous results in a relatively short time. Nitrogen may be added in numerous ways. One of the quickest ways to produce nitrogen is by the addition of a highly concentrated form, such as nitrate of soda. To get the best results from this fertilizer, however, it should be applied at least a month before the trees bloom.

The results that we have produced from experiments with nitrate of soda will be of interest to you. The trees upon which the tests were made were mature, but showed signs of entering a decline, the foliage was thin and yellowish, there was a very small percentage of set, the fruit was small and there were present certain physiological troubles, such as little leaf and fruit pit.

Table No. 1 is a resume of the results we obtained during the years 1914, 1915 and 1916.

Except during the first year, nothing seemingly is gained by placing the nitrogen in liquid form on the ground or spraying it on the trees. The reason for the results the first year is that we had a very dry spring, the dry nitrate was added rather late, and thus the nitrate spread broadcast did not get into solution in time to be of benefit to the trees during the blooming period.

Table No. 2 is of interest in showing the influence of nitrate on the percentage of set and the percentage of fruit in each commercial size.

Note: Figures 175 to 150 and 138 to 112 refer to the number of apples to the box.

In 1916 we conducted some experiments to determine the influence of varying amounts of nitrate with the results shown in table No. 3 on next page.

Table No. 1

Orch No.	Plat No.	Pounds per tree treatment			Yields Loose 1914	Boxes 1915	1916	Yrly. Aver.	Yrly. Aver. 1914-15 1916	Term. Growth Inches
		1914	1915	1916						
1	1a	5.2	5.2	Clover green manure	4.1	8.1	13.0	8.4	15.2	20.1
	2b	5.2	5.2	Clover green manure	.1	8.5	14.8	7.8	11.4	17.1
	3c	5.2	5.2	Clover green manure	.2	6.00	9.6	5.3	13.9	16.1
	4	No fertilizer.....			.2	.31	8.8	3.1	6.9	19.9
2	1a	6.75	6.75	Alfalfa sod.....	1.9	10.0	14.8	8.8	8.4	15.4
	2b	6.75	6.75	Alfalfa sod.....	2.3	9.9	15.5	9.2	10.3	8.4
	3c	6.75	6.75	Alfalfa sod.....	9.8	10.1	15.7	11.8	10.9	14.7
	4	No fertilizer either year.....			2.1	.9	5.7	2.9	6.6	5.2
	a.	Fertilizer broadcast on ground.								
	b.	Fertilizer sprayed on ground as liquid.								
	c.	Fertilizer sprayed on ground and trees as liquid.								

Per Cent of Set and Size of Fruit Influenced by Nitrogen—Hood River Experiment Station

Table No. 2

Plat	Pounds Per Tree	Fruit Set June 4	Per Cent. Sept. 30	175-150	Size of Fruit 138-112	Per Cent 100-Larger
1	6.7a	82.6	34.6	8.28	24.71	68.10
2	6.7b	68.0	30.7	22.13	29.13	48.23
3	6.7c	69.6	37.3	24.61	41.87	24.61
4	.0	35.3	16.4	76.24	18.32	5.43
		73.4	34.2	18.5	31.9	46.9
Fertilized aver. dif.		38.1+	17.8+	57.74—	13.58+	41.47+

During the past year we have conducted additional work in both the Hood River and Rogue River valleys. Tables Nos. 3 and 4 show the results of our experiments for the season 1917.

One can readily see that the trees are revitalized, so to speak, very rapidly, and the influence is shown in the blossoms, percentage of set, and also in the attractiveness of blossoms, the nitrate making them more showy and attractive. The influence is also shown in the percentage of yields, in the size of fruit, and in color. As regards color, however, we would warn against the excessive use of this fertilizer. From three to five pounds, under our conditions, has been ample, and while greater yields can be obtained from seven to ten pounds, the color is so greatly reduced as to be often undesirable.

The nitrate seems to influence the trees for a number of years—at least three years—and certainly seems to give them something more than a mere stimulation. I have been convinced from the results we have obtained at Hood River, that the use of nitrate did much more to the trees than merely to stimulate them.

Table No. 5 shows how the effect of the nitrate may carry over more than one season.

Here the yield one year after application is greatly increased; too much so, since the color is poor.

Table No. 6 is merely a continuation of the experiments shown in No. 3, except that in 1917 we applied the nitrate to only one-half each plot. You see the larger amounts of nitrogen carry over their effect into the second year. About five pounds, however, gives the most satisfactory color, coupled with increased yields.

Under our irrigated conditions, we have advised the growers to sow their orchards to leguminous crops, such as alfalfa, clover or vetch, and to practice thorough irrigation, simply using the nitrate occasionally whenever there is the least sign of devitalization, but depending for a permanent supply of nitrogen and organic matter from leguminous crops.

Under non-irrigated conditions, we are supplementing the use of nitrate by using cover crops. There is always danger, when a grower finds his trees have become somewhat devitalized and that they will respond to nitrogen, that he will overdo a good thing. One must constantly study this question and avoid against extremes in either way. Either too little or too much is undesirable.

Wise Pruning Needed

In pruning the mature trees we must become familiar with their bearing habits; how, when and where they form their fruit buds; and each grower must study this carefully under his local conditions. The mature trees will stand much more pruning than was desirable to give them during the transition period. Even at this age, considerable so-called corrective pruning can be practiced. That is, if certain branches are running away with the tree, so to speak, they should be suppressed so that the smaller, less vigorous branches will have a better opportunity.

If weak forks have been forming, a little corrective pruning will be very valuable. The tendency with the average pruner in the mature orchard seems to be to prune rather spasmodically. He waits until the trees get a little brushy on the one hand, or too weak on the other hand, and then prunes the trees very severely, only to find that he may have done more mischief than good, and that he is upsetting the bearing habits of his trees perhaps for a number of years.

If he avoids doing any pruning, on the other hand, he soon has all the fruit on the top and outside of his trees, finds the spurs dying and the fruit yearly becoming of less commercial value. Pruning should be given the trees every year and an attempt made to reach as many parts of the tree as possible; at least no single area of the tree should be left unpruned over a long series of years.

In pruning these mature trees it must be remembered that the response comes nearest the cut; that if very heavy cutting is made in one spot, right near that cut rank water sprouts will generally grow without influencing to a very marked degree the remainder of the tree; that to get response in many parts of the tree, it is necessary to prune many parts; that by removing some of the devitalized parts, energy can be directed to the remaining parts in proximity to the cut.

We should watch the spurs very care-

Plat No.	Pounds Per Tree	Terminal Growth Inches	Leaf Growth Length	Inches Width	Yields Per Tree Loose Boxes	Increase Per Cent
1	7.3	11.7	2.95	1.79	16.1	87
2	5.00	9.9	2.92	1.90	13.44	56
3		4.1	1.99	1.35	8.56	
4	3.00	14.1	2.90	1.85	12.61	47

Plat No.	Pounds Per Tree	Terminal Growth Inches	Leaf Growth Length	Inches Width	Yields Per Tree Loose Boxes	Increase Per Cent
1	7.3	9.5	2.93	1.92	14.1	166
2	5.00	6.2	2.79	1.82	11.9	124
3		4.5	2.32	1.48	5.3	
4	3.00	6.4	2.75	1.93	9.5	79

Rogue River Experiments

Table No. 4

Spitzenberg Apples. Fertilizers Applied 1917.

Sulfate of ammonia (5 lbs. per tree)	5.93 boxes per tree
Nitrate of soda (5 lbs. per tree)	5.60 boxes per tree
Nitrate of soda (5 lbs. per tree)	
Superphosphate (5 lbs. per tree)	8.73 boxes per tree
Check	1.33 boxes per tree
Dried blood (6 1/2 lbs. per tree)	3.35 boxes per tree

Rogue River Experiments

Table No. 5

Spitzenberg Apples. Fertilizers Applied 1916.

Nitrate of soda (10 lbs. per tree)	21.7 boxes per tree
Check	4.1 boxes per tree
Superphosphate (10 lbs. per tree)	2.5 boxes per tree
Muriate of potash (8 lbs. per tree)	4.3 boxes per tree

Hood River Experiments

Table No. 6

Spitzenbergs

Plat No.		Pounds Nitrate Per Tree		Terminal Growth, Inches	
		1916	1917	1916	1917
1	a	7.3	7.3	11.5	14.48
	b		none		10.79
2	a	5.0	none	9.9	7.66
	b		5.00		13.76
3		none	none	4.1	6.87
4	a	3.00	none	14.1	7.9
	b		3.00		13.9

Newtowns

Plat No.		Pounds Nitrate Per Tree		Terminal Growth, Inches	
		1916	1917	1916	1917
1	a	7.3	7.3	9.5	7.35
	b		none		5.60
2	a	5.0	none	6.2	7.30
	b		5.00		9.60
3		none	none	4.5	3.8
4	a	3.00	none	6.4	3.1
	b		3.00		9.05

fully. A certain amount of spur thinning on mature apple and pear trees can often be done to splendid advantage. Should you watch your spurs carefully, you will note that the percentage of your spurs which bloom decreases as the trees get older; that the percentage of spurs which set fruit decreases even faster; that the amount of growth that a spur makes for a given season has a close correlation to its bearing the following season; that there is a relation between heavy bearing and length and diameter of spur. Branches that have a large diameter have stronger spurs and tend to bear more fruit. Pruning should be so distributed, then, as to encourage a strong spur development. This will often mean a sacrificing of certain weak spurs in order to revitalize the remaining spurs and furnish new wood for the formation of new spurs.

Important Researches

For the past ten years we have been conducting elaborate research studies at the Oregon Experiment Station on the question of fruit pollination. Results of certain of these researches have been published from time to time in our station bulletins. First we determined the sterile and fertile varieties, and the possibility of inter-pollination, but soon found that this was not sufficient; it was necessary to study the morphology of the fruit. This we did, but the results of these studies showed us that further studies would be necessary, and we determined to study the influence of plant food on the setting and dropping of fruit.

Accordingly, our Dr. E. J. Kraus decided to spend a couple of years at the University of Chicago and continue these studies. He had associated with him in these investigations Dr. H. R. Kraybill of the agricultural chemistry department of the Pennsylvania State College. These men chose tomatoes upon which to start their studies, because one can obtain rapid results with tomatoes and can get at least six crops in a season under greenhouse conditions.

Effects of Foods

It was decided to try first the influence of nitrogen on such plants. It was found soon that the plants could be divided readily into three groups. These were:

First, those plants which seemed to be extremely vigorous, rarely bloomed, and, if they did bloom, set but few fruits.

Second, plants which made a very fair growth and seemed to be in good vigor, but bore very abundantly, producing a large number of clusters which readily set their fruit.

Third, plants of less vigor than the second class and that seemed to bloom profusely, but set sparingly.

A chemical analysis showed that the first set always contained an excess of nitrogen; that the second class, which produced so well, always contained a certain relative proportion of nitrogen and carbohydrates, such as sugar and starch; and that the third set of plants always contained a certain excess of carbohydrates and a deficiency of nitrates.

The food given these plants was calcium nitrate and sodium nitrate. Further work was tried by others on cereals with exactly the same results.

Balance is Needful

It would appear from the work of Dr. Kraus and Dr. Kraybill that there is a mathematical proportion between nitrogen and carbohydrates which should exist in plants if they are to be of desired vigor and at the same time fruitful. If there is an excess of nitrates the plant becomes thoroughly vegetative. If there is an excess of carbohydrates, the plant loses its vegetative vigor and also much of its ability to bear fruit.

In other words, there must be a proper balance of these two foods. The indication is that this can be determined by chemical analysis and that a mathematical relation for various plants under varying conditions can be worked out. It seems too simple and too good to be true.

Some Conclusions

Now let us see how this relates to our apple trees. In our first group (our trees from one to five years old) we have the excess of nitrogen brought about by intensive tillage, the use of manures and fertilizers, or heavy heading-in of the trees. These practices induce a heavy flow of raw food, which contains so much nitrogen and which tends to discourage the forma-

American Fruit Grower

tion and storage of elaborated foods, or sugars and starches.

In our second group of trees (from five to eight or nine years old) we find that by reducing the tillage, the heavy pruning and various other stimulations, we are automatically reducing the relative proportions of raw sap and nitrogen and allowing the increased area of leaves to manufacture more elaborated foods, such as sugar and starch, with the result that the trees form fruit buds and come into bearing. We have noted that whenever this class of trees is not treated so that the elaborated food forms in large quantities, we get the opposite effect—namely, vegetative growth and no fruiting.

The third class of trees (those which are in heavy bearing) during the first part of this time are generally in a very satisfactory condition. They have good, desirable vigor, and are bearing heavy crops of fruit of a good commercial type; but as they get older, the leaves get yellow and thin; many of the spurs are dying; the percentage of fruit set is very low, and the fruit is of an inferior commercial grade. An analysis would show evidently that these trees instead of starving had an abundance of food, but of the wrong kind; namely, too much starch and sugar, and too little nitrogen. We know from our Hood River and Rogue River experiments, that, as soon as we began to restore nitrogen, we restored seemingly the proper balance between the carbohydrates and the nitrogen, and that, as a result, our trees are restored once more to heavy bearing, so that the work done by Drs. Kraus and Kraybill seems to be applicable to our trees.

One Big Factor

You will remember that in discussing fertilizer experiments at Hood River I mentioned the fact that I had felt for a number of years that nitrogen was much more than a stimulant. This work done at Chicago would indicate that it has a much broader function in producing the desirable balance in the trees. In addition, the investigators in Chicago found that the use of nitrates tends to make plants absorb more food and moisture.

Nitrogen, then, is the big controlling factor in our American orchards. Whether we influence the amount of nitrogen by pruning, irrigation, tillage or by the use of fertilizer, the desirable vigor in our trees is going to be brought about by our ability to analyze the real conditions and determine its tendencies. Too often we see orchardists study their trees only after they have reached an undesirable condition, the grower having failed to read the signs which the trees generally give him for a number of years. Too often in our orchard practices we treat the trees solely from the point of view of its present condition and not from the point of view of its future.

In conclusion, there is one point which I want to emphasize strongly, and that is the great danger of making a hobby of some single practice and riding it so hard that it ceases to be a virtue, but rather becomes a menace. There are many orchards in which we do not, on the whole, study closely enough the inter-relationship of various practices, such as pruning, tillage, fertilization and thinning, but we are too prone to emphasize one practice which we feel is a solution of all our problems.

I feel keenly that our real success will come only as a result of understanding thoroughly the inter-relationship of all these practices and then applying this understanding to correct any undesirable tendency being established by our trees.

SOD ORCHARD AND MOISTURE

One of the chief objections urged against the sod apple orchard, as opposed to the cultivated orchard, is that the sod orchard suffers more from drought. It is an accepted fact that the fruit from a sod orchard is more highly colored, and may be of somewhat smaller size than fruit from a cultivated orchard, yet we are told that an abundant supply of moisture induces large, brightly colored fruit, while dryness tends to the production of poorly colored apples.

PENNSYLVANIA FRUIT REPORT

We have received from Chas. E. Smith the following report: "Severe zero weather has perhaps damaged a large portion of peaches, plums, cherries and other stone fruits, in most lowlands of Pennsylvania. These have also been killed in some parts of West Virginia. The highland orchards are still O. K."

Mysterious Ancient Fruit Groves of China

By Earle W. Gage, New York

CHINA, according to recent records, was an important fruit growing country 2,000 years before Christ. This is the oldest nation of commercial and industrial importance, and from this mysterious oriental land came many of the world's rare and delicious fruits. The Chinese as a race are great lovers of fruits. They understand the art of grafting, budding, and layering; and although they are less successful in their attempts to originate new varieties, they have been able to preserve varieties thousands of years old. Certain varieties of China's fruits are found only in certain locations. Thus, early voyagers to the orient from other lands, who visited only the sea-coast towns, thought that China raised only rice, hemp, flax and crops of minor importance, but when the missionaries entered the back provinces they were amazed at the luxuriant development of the fruit groves, probably the most extensive in the world. But the Chinese, unlike the Americans, never prune their trees, although the trees are dense and the branches thickly interweave. The only fruit scientifically pruned is the grape, but this would not receive attention if its life did not depend upon it.

come for the owner for almost a lifetime. The fruit is used mostly in fresh state. The fruit keeps well for several months, the Chinese piling the picked fruit on the ground, where it will freeze and keep until spring. The persimmons are dried, and occupy as large a field in commerce in China as dried figs do in this country.

Peaches Originated in China

"Tau," or peaches, is one of the world's oldest fruits. China is the original home of this rare fruit. The varieties consist of Chinese Cling, the Honey group, and the Peento group. These varieties have been successfully grown for several years in the southern part of the United States, having been given American names. In fact, every important commercial variety of the peach originated in China.

Apricot trees grow in forest-like density in many sections of northern China, Manchuria, and Korea. Under cultivation the red, orange, yellow, red-and-white, and white-spotted varieties predominate. The Shantung province is world-famous for its fine apricots. Many of the rare varieties grown in California were introduced from this section. Giant apricot trees which are 40 feet tall, are found in the fruit



Thrifty Persimmon Orchard, Ming Tombs Valley



Large Chinese Jujube Tree

What the Chinaman fails to bestow upon the fruit trees he multiplies upon the soil, which has been the great secret of his success with fruit. All fruit orchards are cultivated except those of the famous jujube, which do not demand it, but these are kept free from weeds. The trees are not sprayed as in this country. In some communities the bark of fruit trees is scraped scrupulously clean each winter. The trunks of peach trees are often white-washed, which kills insects. There are so many larger insects which prey upon the tree insects that spraying is not needed.

Chinese Prefer Hard Fruits

A peculiarity of the Chinese is that they do not relish soft fruits. At royal banquets, fine-looking but extremely hard pears are served, and are keenly relished by the most cultured Chinese. For this reason raspberries, red currants, gooseberries, grow wild in the hills and mountains, but are not cultivated.

The persimmon is one of the most important tree fruits of northern China. Certain valleys have been given over entirely to its cultivation for thousands of years, the revenue from the sale of the fruit forming the main income of the natives. The trees are planted about 20 feet apart, and as it takes several years to grow the trees, peaches or bush fruits are grown between the rows. The trees are thrifty growers, attaining a height of 30 to 50 feet. This fruit has two distinct varieties, the seedless and seeded. The trees reach the age of 40 to 50 years, which means that the setting of one orchard will mean a sure in-

groves, the trunks measuring as much as 10 feet in circumference. The apricots growing in northern China could easily be grown in New York, Massachusetts, Michigan or Wisconsin, Department of Agriculture officials believe, and no doubt introductions will be made.

The plum is a fruit which is not very highly esteemed in China. The people seem to have had this fruit forced on them, but it is too soft to meet their food needs. But the Shantung province contains some of the most important plum orchards in the world, the fruit being exported. Pekin merchants offer delicious plums the year around, so general is this variety.

Next to the peach, the pear is probably the most highly appreciated fruit in northern China. The pear groves are located on terraced fields and patches in the mountains, while commercial orchards are cultivated on the plains. But Chinese pears lack the improvements which the fruit demands, and the taste is not very delightful to the foreigner, accustomed to American fruits.

100 Varieties of Jujubes

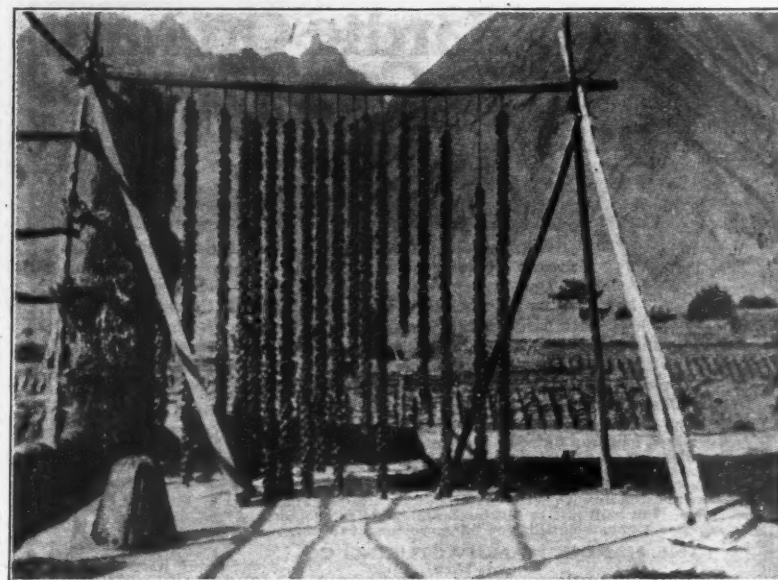
The jujube, which has been introduced into the United States recently, is an important fruit crop of northern China, being grown everywhere the winter temperatures are low. There are not less than 100 important varieties of this fruit, varying in size and color, shape, quality, etc. The fruit is eaten fresh, dried, preserved in sugar, stewed, or smoked. Each variety is used for a certain purpose.

The grape is as much esteemed by the

Chinese as by western world people. It is not a native of China, being introduced there from central Asia by the Emperor Wu Ti, who, in the first century before our era, sent 10 envoys to various countries west of China, who returned with grapes and alfalfa. Numerous indeed are the various species and varieties of citrus in China. As is well known, southern China is supposed to be the native home of the sweet orange. Besides this species, mandarins and tangerines and kumquats are in all probability natives of China. In the vicinity of Hangchow wild pomelos occur, while in Shensi and Shantung citrus is

found in its wild state, just as it was discovered hundreds of years ago by early pioneers. China possesses some 80 kinds of edible oranges growing along the southern coast and on the numerous islands fringing the coast.

Bananas, pineapples, and hundreds of other fruits give the Chinaman a wide diet of fruit foods and make him also commercially important as a grower for large markets. Educational avenues are taking new interest in the development of fruit orchards, and western methods will serve to improve eastern production and marketing facilities.



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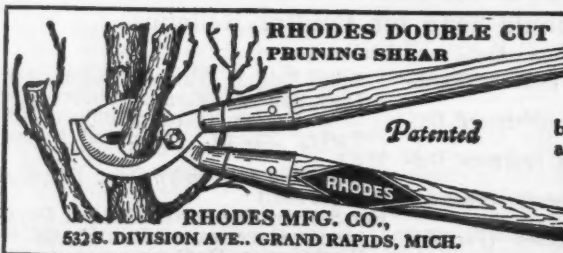


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Farm Fruit Garden

A plea is made for the farm fruit garden for the following good and sufficient reasons: Home-grown fruit is better than the commercial varieties because the fruit that ships best is seldom of the finest quality and must be shipped somewhat green. The family is better provided because buying fresh fruit is expensive. A supply of fresh fruit may be kept up continuously all summer by a judicious selection of kinds and varieties. The surplus may be canned or preserved for winter use.

It is interesting to note that this advice to plant a home fruit orchard comes from the inhospitable clime of North Dakota, and is issued in Bulletin No. 9 of the Agricultural Extension Department, Agricultural College, N. Dak. H. O. Werner, the author, sees no reason why the farmers of that state should not have rewarding fruit gardens if they will be wise in their choice of hardy varieties, and will comply with the demands of the climate in their care of these gardens.

After reading what can be done even under unfavorable natural conditions, we must feel it is a reproach to us who live in more favored sections not to add this great attraction and value to our farms. Much of Mr. Werner's advice is excellent for those who contemplate establishing a home fruit orchard anywhere, and nowhere could better information be gotten in a general way as to the requirements for success. Each of the following subjects is carefully considered and full directions given with the reasons therefor.

Size of Fruit Garden

First, size of fruit garden, and it is agreeable to learn that one-half acre, well planned and cared for, is sufficient for the needs of the ordinary farm family. The location is then discussed and all causes of the advantages of one location over another are considered. The windbreak is strongly advocated in such sections as his own, but may be unnecessary in a large number of localities. Perparation of the soil for a few years preceding the actual planting of the orchard next receives his attention, and with this the importance of proper drainage and the manner in which it may be secured.

The selection of nursery stock should be most carefully made or success is impossible. Many points in this connection are made for the guidance of the prospective fruit grower. Care of this stock between the time of receiving and the time of planting is clearly described. Advice as to time of planting, method of making the holes, distance apart of various fruits, etc., supplies the farmer with much needed and valuable information. Pruning, both of the roots and tops, is explained by illustrations as well as reading matter. Conserving the soil moisture often spells the difference between success and failure. Cultivation is advocated and described. Mulching is discussed with several words of warning and not many of approval. Thinning is a great advantage when the tree is heavily loaded and results in more and finer fruit. Excessive bearing leaves the tree weak and subject to winter injury.

Care of Trees

Treatments are given for all kinds of injuries and for the usual insect pests and diseases of the various fruits. Special tools and spraying outfits are recommended. Finally the different kinds of fruit themselves are taken into consideration and the special treatment best for each is given. The effect of reading this bulletin is to convince us that there is no reason why we should not all have a suitable home orchard which will, without undue trouble, provide our families with apples, pears, peaches, grapes, plums, cherries and the many delicious berries.

It is reasonable to suppose that we would be healthier, happier, more prosperous, and certainly better satisfied with ourselves, if we ornamented our farms and delighted our family with a good home orchard which would keep a continuous supply of fresh fruit from early spring until the last apple had gone, and we know that's pretty late in the next spring. Besides, think of all the jams, jellies, canned fruits, and preserves that would take the monotony out of the winter diet.

Mr. Farmer, put your spare cash right back into the soil whence it came. It belongs there if you are to raise bigger and better crops for winning the war this year.

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Ohio Horticultural Society Meeting

By Robert B. Cruikshank, Ohio

THE Ohio State Horticultural Society met in its 51st Annual Convention at Ohio State University, Columbus, January 29-30. The meetings were held in conjunction with the Annual Farmers' Week. The attendance at the meetings averaged about 300, and was very satisfactory considering the hard weather and present traffic conditions.

The Ohio State Horticultural Society (for 20 years previous to 1867 known as the Ohio Pomological Society) represents in its membership the bulk of the best and largest fruit growers in the state, as well as members of the Agricultural College and Experiment Station staffs who are interested in the subject of fruit growing. It is one of the real old State Horticultural Societies in the country.

The program of the meeting was of the usual excellence, and universal satisfaction was expressed by the members and visitors as regards the value of the papers and discussions.

Prof. Green Speaks

Prof. W. J. Green, horticulturist at the Ohio Experiment Station, opened the program with a paper entitled "Some Notes on the Distance Between Trees in Planting at the Experiment Station Orchard." He stated that apple trees planted 35 feet apart began to crowd each other at 25 and 30 years of age, the branches of one tree intermingling with those of another. The root systems had begun to compete with each other long before that. He discussed the consequent necessity of the trees growing up and very high and the various and difficult problems in pruning which result from such conditions. He called attention to the greater feeding areas afforded tree roots when the planting distances are increased. His figures showed the advisability of planting fruit trees far enough apart so that each tree would have plenty of room in which to develop. On strong soils this would be for apples at least 40 feet and in the case of fillers even more, so that the filler trees could stay in longer without danger of injuring the permanents.

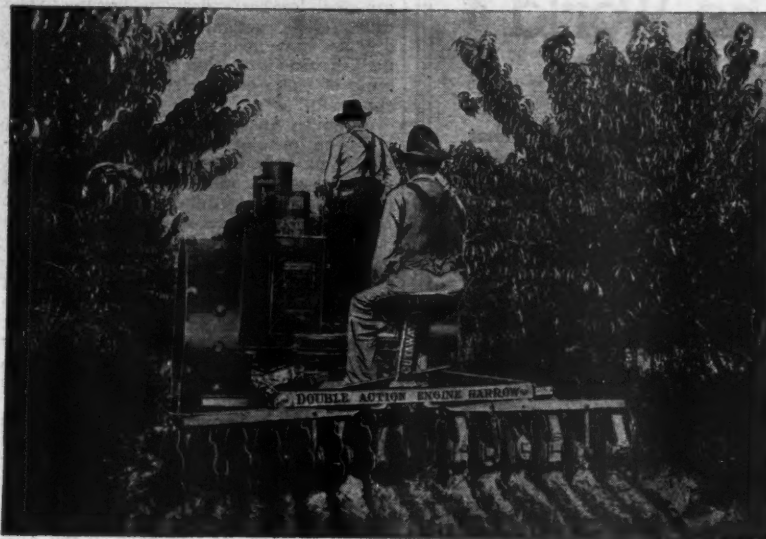
Dr. Hedrick a Guest

The Society enjoyed as one of its guests Dr. U. P. Hedrick, horticulturist at the New York State Experiment Station at Geneva. Dr. Hedrick discussed the "Outgo and Income of a 10-Acre Apple Orchard," using figures collected from 10 years of accounting in such an orchard in Western New York. He urged the business necessity of keeping cost records in orchards if there is to be a real financial understanding of orcharding. At the present time there are very few figures available with which comparisons may be made and upon which orchard values may be based. In the orchard in question, the costs per barrel based upon an average annual production of 116 barrels per acre were as follows: Interest on investment 21 cents,

taxes 1.2 cents, depreciation 17 cents, tillage 6.3 cents, cover-crop seed 2.3 cents, pruning 3 cents, spraying 9.6 cents, supervision 25 cents, barrels 36 cents, making a total cost of \$1.29 per barrel. Receipts were \$2.60 per barrel for barreled stock and 67 cents for cider and evaporator stuff, giving a profit on the former of \$1.31 per barrel and a loss on the latter of 21 cents, or a net profit per acre per year of \$95.60. This gives a net profit of 24.6% on a valuation of \$500.00 per year. The conclusions he was able to draw were that apple orcharding was like any other business; some men made money while others lost, but

soils for apple growing. Mr. Ballou has carried on a great many fertilizer experiments in southern Ohio apple orchards. Nitrogen alone or in combination with acid phosphate applied around the tree about blossoming time has always brought marvelous results. Five pounds of nitrate of soda per tree has increased the crop value in three different orchards, \$2.80, \$2.95 and \$3.66 per tree per year for the past five years.

Records kept in two orchards in Ohio for a ten-year period showed, according to Prof. H. A. Gossard, net annual returns of \$80.00 and \$182.43 per acre, respectively.



It Pays to Cultivate Your Orchard

that the business promised profit for the man who would use his head and his hands with intelligence.

Prof. Ballou's Observations

The horticultural work on the county experiment farms in Ohio was explained by Mr. F. H. Ballou who has charge of it. His observations in connection with pruning experiments on young orchards on a number of the farms were that both light dormant and light summer pruning were conducive to early bearing on apples. Heavy dormant pruning forced out too sappy a growth for fruit buds to form. Heavy summer pruning he considered of no use whatever, in fact a detriment. He found a close relationship between aphids and blight on young trees. He called attention to the great adaptability of southern Ohio hill

spraying for codling moth in the first orchard reduced the injury from worms from 50% to less than 2%.

Beautify the Home

In an illustrated talk on "Bulbs for the Farm Home," Professor A. C. Hottes, of the Ohio State University, appealed for some beauty about the home, especially at this time in order to counteract the many sadnesses of the war.

Apple blotch is a serious disease of apples which is making its appearance in southern Ohio, coming in from Indiana and the Mississippi and Missouri Valleys. Mr. Richard Walton's recommendation for its control was to spray with bordeaux mixture—three, five and seven weeks after the falling of the petals of the blossoms.

Professor O. D. Selby, botanist at the

Ohio Experiment Station, in reading his report of the conspicuous diseases in Ohio in 1917, urged that every effort be expended at the present time to reduce the losses from disease especially on food crops.

Ohio, through its Bureau of Markets, is preparing to adopt regulations for the standardization of apples and other products. This is in line with what other states are doing. Considerable discussion was brought out in an attempt to find out just what sizes and grades should be adopted as regards apples, as the Bureau of Markets is anxious to make any new law it may devise satisfactory to the apple growers. Any Ohio law which is passed will doubtless be in close conformity to the law proposed by the U. S. Department of Agriculture.

Labor Shortage

Mr. E. J. Riggs, prominent southern Ohio fruit grower, called attention to the certain labor shortage in case there is a big crop of apples, and urged that some steps be taken to relieve such a situation, especially at harvest time. He argued that more pruning, spraying, thinning and grading should be done, as "quality was the battlefield upon which western competition must be fought," his claim being that increased costs in productive labor results in greater net profits.

Dr. O. F. Hedenburg, of the Mellon Institute of Industrial Research of the University of Pittsburgh, explained some of the chemical reaction concerned in the manufacture and combinations of spray materials.

Calcium arsenate as an insecticide was shown by J. R. Stear, of the Ohio Experiment Station, to be of promise. He told of experiments in several parts of the country, in which this new insecticide was used successfully and at less cost than arsenate of lead. It is not recommended for stone fruits, but is worthy of a trial by apple growers.

Mr. E. H. Waid told of an inspection trip he made to Bowling Green, Ky., to study the methods in vogue there which tend to produce and put upon the market such exceptionally good strawberries. He found that grading regulations were strict and that they were rigidly enforced.

The meeting closed with an illustrated talk on "Potato Diseases in Ohio and Their Control," by Mr. D. C. Babcock, of the Experiment Station. He divided potato diseases into those which could be controlled by (1) seed selection, (2) by seed disinfection and (3) by spraying.

A complete report of the papers and discussions will appear in the annual report of the Society, which will be published in March.

The officers chosen for the coming year are: W. G. Farnsworth, Waterville, president; R. B. Cruikshank, Columbus, secretary; V. H. Davis, Columbus, treasurer; W. E. Bontrager, Wooster, librarian.

Suggestions for Buying and Planting Your Orchard

Number of Trees for One Acre

Feet	In.	Feet	Feet
1 x 3	8	11,880	10 x 12
2 x 3	8	5,940	12 x 12
2 x 5		4,356	12 x 16
3 x 3		4,840	16 x 16
3 x 6		2,420	18 x 18
3 x 8		1,815	20 x 20
4 x 4		2,722	20 x 30
4 x 6		1,185	24 x 24
5 x 5		1,742	25 x 25
5 x 8		1,089	30 x 30
6 x 6		1,210	32 x 32
6 x 8		907	34 x 34
8 x 8		680	36 x 36
8 x 10		544	38 x 38
10 x 10		435	40 x 40

To determine the number of trees per acre for any given distance, multiply the distance between the trees in the rows by the width of the row. Take the resulting answer and divide 43,560 by it. The resulting figure will give you the number of trees per acre.

For example: To determine the number of trees, planted 30 x 30, required to set one acre: $30 \times 30 = 900$.

$43,560 \div 900 = 49$ trees per acre.

Right Distance to Plant

Apple	24 feet to 40 feet
Usual distance	32 feet to 36 feet
Apricot	16 to 20 feet each way
Asparagus	1 to 2 feet between plants, in rows 3 to 3 1/2 feet apart
Blackberries	2 to 5 feet between plants, in rows 5 to 7 feet apart
Cherry, Sour Sorts	16 to 20 feet each way
Cherry, Sweet Sorts	20 to 30 feet each way
Currant	4 feet between plants, in rows 5 feet apart
Gooseberries	4 feet between plants, in rows 5 feet apart
Grape	8 to 10 feet apart each way
Many vineyardists plant grapevines	8 feet apart in the rows, the rows 10 feet apart
Hedge Plants	1 to 2 feet apart
Ornamentals—The planting distance for ornamentals varies with the kind of shrub or bush and the purpose for which it is used. Roses should be planted about two feet apart, hedge plants about one foot, other shrubs about one-third to one-half their height when full grown. See descriptions for height when grown.	
Peach	16 to 20 feet each way
Pear, Dwarf	10 to 15 feet each way
Pear, Standard	20 to 30 feet each way
Plum	16 to 20 feet each way
On good soil, the strong growing Japanese sorts should be planted not less than	20 feet.
Quince	10 to 16 feet each way
Raspberries, Black	3 feet between plants, in rows 6 feet apart
Some prefer Black Raspberries	6 x 6 feet.



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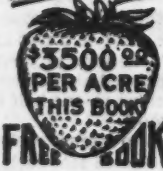
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1000 Progressive, or Superb, \$7.50, express collect

Think of it, a few dollars' worth of plants will give you all the berries you can use fresh from the vines this year from July to November, at less than 2c per quart. And any market will gladly take all you can grow at 25c to 50c per quart. Get the Townsend 20th Century Berry Book; it's free and worth dollars to you. Fully describes everything in small fruit plants. "If it's small fruit plants, we got 'em"—Grapes, too.

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Kindly Mention American Fruit Grower when writing to Advertisers

Getting Ahead of the Woolly Aphis

By J. K. Shaw, Massachusetts, Experiment Station

The woolly aphis is one of the serious pests of apple trees over much of the apple region. More especially in those parts having a relatively long, warm summer. It has recently been shown by Dr. Edith M. Patch, of the Maine Experiment Station, that, like many other plant lice, the woolly aphis divides its attention between two distinct plants, moving from one to the other at definite seasons of the year. In this case the alternate hosts are the apple and the American elm. The woolly aphis infests both the aerial parts of the tree and the roots. Those found in the tops of the trees may be destroyed without great difficulty by proper spraying, but those on the roots are much less easily destroyed owing to the difficulty of getting at them. Various schemes have been proposed, but owing to ineffectiveness or high cost of application none of them can be set down as really successful.

In South Australia where apple growing has been quite extensively developed during the past ten years the problem has been met and solved and there seems to be no good reason why similar means should not be equally successful in America.

In Australia

The insect was carried to Australia from the United States and is known there as the American blight. Before the present methods were adopted the apple industry was threatened with destruction by this insect, but it is not now feared by the growers.

It is common knowledge all apple insects are more troublesome on some varieties than on others, and some may be nearly or quite free from serious injury from a given insect. Thus it has long been known that the Northern Spy is rarely injured by the woolly aphis. The fact gave to the Australian fruit men the clue that led to getting ahead of the woolly aphis.

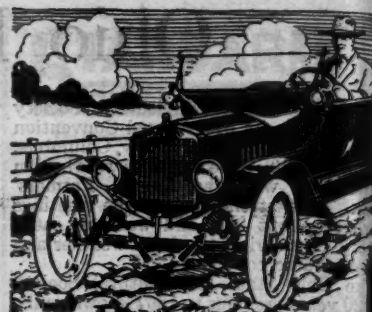
It must be noted that in an orchard of Jonathan apple trees only the part of the trees above ground are Jonathans: the root-systems are of as many varieties as there are trees, or, in other words, they are seedlings. Among these many seedlings, few are likely to be markedly resistant to the woolly aphis as is the Northern Spy. Our Australian friends have made all the underground part of their orchards of varieties known to be resistant to this insect. Our own Northern Spy is the variety most used.

The problem of getting the varieties desired on Spy roots is not an easy one and various methods have been tried with more or less success. One is to make an ordinary piece-root graft, with the root a little shorter and the Spy scion a little longer than usual, and planting deeply in moist, rich soil with the hope that the scion may produce a root system, when the seedling root may be cut away and the tree budded to the desired variety. Another method of inducing the Spy to form roots is by layering, preferably by mound layering, as is practiced in producing dwarf apple stocks. Once roots are produced the small tree is planted out and budded or grafted to the desired variety.

Propagate from Root Cuttings

When own-rooted trees are secured they may be quite readily propagated from root cuttings. Stem cutting from apple trees do not root at all readily and in our experience the Northern Spy shows about as little inclination to form roots as any variety.

Of course the cost of producing Jonathan and Winesaps on Spy roots by any of the above methods would be considerably greater than by the common methods, but the first cost of the trees is a small part of the expense of growing and maintaining an orchard. In those parts of the country where the root form of the woolly aphis is a serious menace, the extra cost would be slight in comparison to the benefit derived, provided the method proved successful, as it has in Australia. At least one nursery firm in this country is growing trees on Spy roots, and there seems to be no reason why it should not become a general practice, especially in the deep, rich soils of the nursery of the middle west, for root-grafted trees seem to have a greater tendency to root from the scion in those soils than elsewhere.



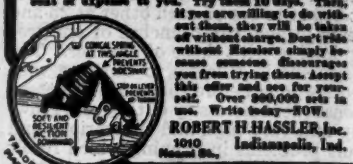
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East Texas, the Land of Profitable Products

By Robert G. Culberson, Texas

\$190 per acre rice on \$75 land



Last Spring, Bower Bros., near Gillett, Ark., bought a rice farm for \$75 per acre. The first crop (1917) yielded 95 bushels per acre, or \$190 per acre at the \$2.02 per bu. price offered them. Other rice growers along the

Cotton Belt Route in Arkansas

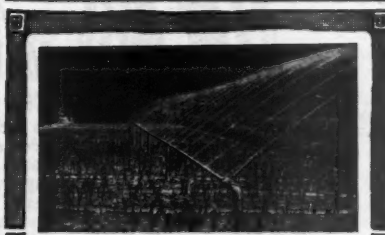
are doing as well. Dr. Bunn, of Humphrey, has been raising rice for eight years and has averaged 90 bushels per acre (now worth \$2 per bu.) His cost of growing has averaged \$20 per acre.

Rice growing in Arkansas is a settled, successful proposition that any experienced wheat or corn farmer can undertake. The same methods are followed as for wheat, except that rice is watered. Farmers, with but little capital, are getting a start on a share basis, under which the owner furnishes land, seed, water and machinery for threshing; the renter gets half the crop for supplying labor, tending the crop, etc. Half a rice crop means more money than a whole crop of wheat or corn up North. Get our

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giving actual experiences of rice farmers in Arkansas. Tells methods of raising rice, etc.—every fact you want to know before making a trip of investigation down there. Please write today.

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Average strawberry yield in U. S. A. to an acre is 2,000 quarts. With the Skinner System of Irrigation, average yield per acre is from 8,000 to 10,000 quarts. Enough berries were picked from fields irrigated with the Skinner System after the unirrigated fields had quit bearing to pay for the total cost of the Skinner System in one season," says Dr. A. C. True of the U. S. Dept. of Agriculture.

Equally profitable results obtained on other crops. Send \$18.75 for a 50 foot Sectional Movable Sprinkler Line. Waters space 50 feet square. 100 foot line, \$36.25. Other lengths in proportion. Send for Catalog.

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Packing Elberta Peaches, Bunslick, East Texas

THERE are those who think East Texas the greatest peach country in the world, not only for Elberta, but for Carmen, Yellow Swan, Mamie Ross and other varieties which ripen a month or two weeks earlier than the Elberta. If not the greatest, it certainly is a natural peach country, a fact advertised on all sides by the spreading peach orchards that clothe the hillsides.

Here are several instances of actual returns made from the gardens and orchards around Mt. Pleasant, Mt. Vernon and Jacksonville, East Texas, the center of the peach and tomato industry.

Several years ago Mr. L. Snider bought 35 acres of land a mile from Mt. Pleasant, paying \$1,700 for it. Five acres of this land he put into peaches. Three of his crops netted him \$1,500 and he was offered and refused to accept \$3,500 for the place in the spring of 1916. His 1916 peach crop, running to 1,400 bushels, netted him about \$200 an acre.

A Kentuckian Success

Mr. Charles S. Martin came from the bluegrass section of Kentucky. He had been all over the United States hunting a location for a peach orchard. He bought a small piece of land on time at Mt. Vernon, East Texas, and began general farming in a small way. He saved his capital, and soon bought a larger tract and began setting out peaches. He now owns 500 acres adjoining Mt. Vernon, and has 300 acres in Elberta peaches, and shipped 50 carloads from his own orchard last year. Mr. Martin does not plant his peach trees 20 feet apart, as is the usual custom in Texas, but insists on giving each tree 30 feet of free space. One result is that he loses almost no trees. His oldest orchard has only three or four vacant spots in it caused by dying trees. Also he claims that it gives him a handsomer fruit, as it lets the sun have freer access to the growing peaches. He sprays twice a year with lime-sulphur, and carefully cultivates between the trees every year. Peas or peanuts are usually planted between the trees, and after the peaches are gathered, hogs are turned in to harvest them.

A remarkable but characteristic fact about Mr. Martin's peach orchard is that part of it is 17 years old. This began bearing the third year, and 12 out of 14 crops from it have been "good" crops.

But the East Texas peach grower does not limit his operations to the orchard. Early berries are a profitable companion crop. Irish potatoes yield from 75 to 100 bushels to the acre and tomatoes from 300 to 400 crates. Sweet potatoes is another profitable crop and there are lots of other garden crops, such as asparagus, cabbage and peppers which bring the farmer a great deal of money.

The truth is that the East Texas farmer can grow almost anything. It is a mixed farming country. M. W. Burton of Bul-

lard, East Texas, says, "I feel satisfied that my tomatoes have averaged me \$100 per acre net, for the last six years."

Mr. S. T. Battles, who lives one and three-quarters miles west of Winona, in Smith County, sold \$348.80 worth of strawberries from one acre, besides numerous little dribbles sold at odd times to special customers in Winona.

Truck Farms Profitable

Mr. G. W. Boring conducts an eleven-acre truck farm near Jacksonville, East Texas, and specializes on strawberries, blackberries, grapes, tomatoes, and all kinds of small fruits. He makes a larger net income from his little farm than do many farmers from 200 to 300-acre farms. Last year he had one acre of tomatoes from which he sold 174 four-basket crates, 12 one-bushel baskets and in addition canned 2,950 ordinary cans of tomatoes. Mr. Boring gets 200 to 400 crates of blackberries to an acre and finds ready sale for all that he can produce.

The report of the government marketing agent for the territory shows that 1,235 cars of tomatoes were marketed from East Texas during the early part of the season of 1917. The greater part of this production came from along the Cotton Belt Route. The amount paid the farmers who grew the tomatoes was over \$1,100,000, or over \$900 a car. In many instances the returns were over \$200 an acre. These tomatoes were not grown by a few large growers, but by hundreds of individual farmers who cultivated from one to five acres along with their other crops. The money received for East Texas tomatoes was distributed among a large number of families and persons, thus bringing substantial development to the country.

East Texas tomatoes, like the peaches from that region, are known over a wide



Picking Elberta Peaches, Bunslick, East Texas



Big Profits

growing STRAWBERRIES. \$300 to \$500 made per A. by inexperienced beginners following "Keith's Ways to Successful Berry Cultures." We can save you \$2 to \$5 per 1000 on plants. Satisfaction Guaranteed or Money Back. Our 1918 catalogue contains valuable and practical information on growing Small Fruit. Illustrated in colors. This valuable Book Free. KEITH BROS. NURSERY, Box 303, Sawyer, Mich.

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We are enabled, because of these, to grow the best trees, true to name: north grown trees, shrubs, berry plants, vines, roses—everything for the garden and orchard. Instructive catalog, specifying prices, will be sent on request. Address GREEN'S NURSERY CO., 106 Wall St., Rochester, N.Y.

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ONLY \$80.00

8 MEN CAN'T STICK IT!

American Fruit Grower Plan That Flower Garden

By Isabel Somers, Tennessee

Winter is the season for planning, summer that of joyous realization. If you care to anticipate the pleasures of a flower garden next spring it is none too early to begin making your plans. On one of these more than chilly evenings you will find it almost as good as a trip to Florida to get out a pencil and paper and lay out the flower garden.

A good business man once impressed it upon me that the only sensible way to send a telegram is to say exactly what you wish to, without counting the cost in words, and then, if necessary, cut out what is not essential to the meaning. So, in planning a flower garden, I would always think first of exactly what I want (within reason) and then, after consultation with a good nursery catalogue, substitute less expensive varieties, or, if need be, cut some out altogether.

So, now get to work. Lay out on paper the plan of your beds and borders—the border has much to recommend it over the bed for those who must plan a simple garden, easy to care for—decide what you want in each plot, not forgetting certain important points.

How to Plan Wisely

First—Consider what help you will have in caring for your flowers and do not make the mistake of laying out more than it will be a pleasure to look after. A few well-kept beds are far more pleasing than a large neglected garden, and will really yield more flowers.

Second—Consult some good authority as to the succession of blooms, so that you may have blooms all through the growing season from crocus time to the last bright glow of salvia and chrysanthemum.

Third—See to it that the plants which will bloom in proximity to each other at the same season shall be harmonious in color. A friend, with a terraced garden, wrote me in ecstasy of her pink and white larkspur terrace. Could anything be more dainty? Nature herself seems to lean to this color scheme when she first opens her book of the blossomy seasons. Think of the snowy dogwood, the pink crabapple, the rosy judas tree, the white fringe in the woods, as well as all of the exquisite pink and white fruit blossoms.

Fourth—Remember to set your taller plants back of the lower ones, so that they may not shut the latter from view. Of course, shrubbery must always be set behind annuals, and personally I consider shrubbery and perennials not only supremely satisfactory from the standpoint of beauty, but also eminently suited for the garden of the flower lover who has no hired gardeners. They give more return for less work than do the frail annuals. But who can resist at least a few of these?

Last—When you have pretty much made up your mind as to what you want and where you want it, get the catalogue of some reliable nurseryman and order from him. If the plants seem a trifle more expensive than those from some unknown dealer, they are still apt to be cheaper in the end. If you live in the country and maintain those neighborly relations which are one of the greatest charms of country life, you will find that owners of gardens on all sides are glad to help you out with roots, bulbs, cuttings, slips, etc. This is a saving of money and also saves the plants from the trial of long transportation.

I hope you will plan and plant a garden this spring, and good luck to you.

THE LITTLE PRUNING BOOK

By F. F. Rockwell

It's astonishing what a lot of information is to be found in this attractive little volume of less than 40 pages of reading matter. The fruit grower and the flower gardener will be equally pleased with it. The author rightly calls it "An intimate guide to the surer growing of better fruits and flowers." Not only are we told when and how to prune trees, cane fruits, grapes, small fruits, shrubs, hedges, flowers and vines, but we are taught why this should be done, in a delightfully chatty yet scientifically instructive manner.

Published by Peck, Stow and Wilcox Co., Cleveland, Ohio.

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Increased food production is the crying need of the country. More corn, wheat, oats, rye barley—more land under cultivation—more productive labor from horses, machinery and the men on the farms. Efficiency and greater output are not only patriotic duties, but they insure increased profits. And the

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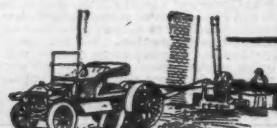
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The E. G. Staude Mfg. Company

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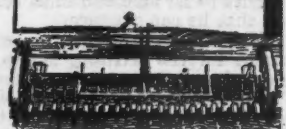
I have got my Staude Mak-a-Tractor belt power attachment at work and it sure is great for cutting wood and grinding feed. I saved over 40 cords in one day, same as large as 14 inches in diameter and all three men could lift. I say it is great. Glenn C. Wood, Lima, Ohio.



I plowed 150 acres with my Staude at a cost of less than 50 cents an acre. My car is just as good as ever and the engine doesn't heat. I used about one quart of oil a day. I plowed 5 acres a day where I could only plow 1 acre with a horse and gang. It does the work of six horses and not four. J. S. Walter, Crafton, N. D.



I cut all my wheat, 400 acres, with a Staude Mak-a-Tractor and am plowing 10 acres a day at the present time with a 14 inch gang, and don't have any trouble with it heating and it doesn't damage the car as much as running on the road. A. Christopherson, Flaxville, Mont.



My Staude Mak-a-Tractor pulled a 14-inch grain drill over 200 acres of newly broken prairie soil, pulled a 3-section harrow over 200 acres and the same drill over 400 acres more land—all newly broken soil. I averaged 2 1/2 acres per hour with the drill. It has proven absolutely satisfactory. Carl F. Erbe, Garden City, Kan.



I have pulled two 14-inch plows in and for five hours and 4 tons on the road for eight miles with my Staude Mak-a-Tractor and the engine never boiled. I don't see that it hurts the car and it will do all the company claims. G. F. HARRIS, Orange Lake, N. Y.



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Planting the Orchard and Growing War Crops

By Paul C. Stark, Associate Editor

THE problems that confronted the fruit grower 12 months ago have been changed just about as much by war conditions as have the other industries of the country. In this article I am suggesting a few things that can be done by the fruit grower to meet these changes, and by so doing he will be answering the call of his Government and at the same time helping his bank account.

The problem is to grow as much food of all kinds as possible, and to use every available foot of productive land—or land that can be made productive.

There are a number of steps that can be taken that will help increase the production of food and relieve the shortage of

age, and about as much can be grown on the land as could be if they were not there. Where a man is to grow a tilled crop, he can just as well have the trees on land growing into a valuable asset.

Some of the crops to grow are as follows: Corn is perhaps the most general crop. It needs the same kind of tillage as the trees. If the soil is rich enough for a good corn crop the corn will not injure the trees unless a hill of corn actually leans on and shades a tree. Corn is needed in unlimited quantity and fills a definite need. No danger of getting a surplus in any sized orchard. On new land it helps to shade down sprouts. Corn should not be grown too close to the trees where the soil is weak.

Low growing crops like potatoes, sweet potatoes, tomatoes, cabbage, melons, cantaloupes, etc., may be grown where the orchard is not too large or where there is a good vegetable market. These low plants do not share or compete with the trees. As large a crop may be grown as if the trees were not there.

Navy beans, soy beans, cowpeas, or in the South, peanuts may be grown and even improve the soil for the trees. On new land they help shade down sprouts. They are much needed war crops.

Strawberries or blackberries are excellent orchard crops. Often they yield a good profit after paying for growing the orchard to bearing age.

Rye or winter vetch may be used for a fall, winter and spring cover crop, where winter pasture is needed for poultry, pigs, or small stock. These crops should be turned under in the spring and will add plant fibre to the soil.

On the experiment station grounds, in 1917, navy beans in the young orchard yielded 20 bushels per acre at \$9.00 per bushel, or \$180.00 per acre. Most of the tillage and weed-killing was done by discing and harrowing the ground before the beans were planted in late June. After the beans were in they needed but little tillage.

Soy beans in another plot of the orchard yielded 30 bushels per acre at \$3.00 per bushel (besides the vines had a forage value); \$90.00 per acre for the seed.

Peas and some of the high-yielding and high-priced beans yielded over \$300.00 per acre net, after paying for cultivation of trees as well as the crop. This is exceptional but shows the possibilities with valuable crops.

Two of my former students, who are working on salary, have a 20-acre orchard, four years old. They have grown corn, navy beans, soy beans and cowpeas between the trees each year, alternating these crops. They have hired all the work done by an adjacent farmer except planting and pruning the trees, which they did themselves on days off from their work.

The crops grown between the young trees during the past four years have paid for purchase price of the trees, preparation of the land, wages reckoned for themselves for planting and pruning, wrappers and wrapping trunks against rabbits, all cultivation and care of the orchard and companion crops, and has left a balance of \$126.00 for the 20 acres at the end of four years, except for the price of the land. That, with the trees four years old, is probably worth three times what they paid for the land. They can sell it for twice what they paid, but it is not for sale. In other words, the companion crops have paid for the planting and growing of the orchard to four years old and left them a balance of \$6.20 per acre.

A former student bought 40 acres of land 16 years ago. He planted 20 acres to orchard and has rented the other 20 as pasture. He worked on salary and hired all work done. He grew similar crops between the trees with the addition of some strawberries. At the end of eight years the place had paid for growing the orchard and 13% per acre profit on his whole investment.

The orchard has been bearing eight years and has netted between \$1,500 and \$2,000 each year for the crop. This year the crop brought \$3,600, over \$2,000 of which was net profit with all labor hired.

There never was a time when an orchardist could put out an orchard with as fine an outlook for profits as now. Well sprayed, well pruned and well managed, an orchard yields the most profitable crop of any Missouri farm product. I could mention instances galore of handsome profits from Missouri orchards in recent years, since men have begun to grow good dessert sorts, spray, prune, grade, and pack well and adopt modern methods.

Very truly yours, J. C. WHITTEN.

Young Orchards and War Crops

In that splendid book, entitled "Fruit Growing in Arid Regions," by Paddock & Whipple, the authors wrote: "If one is endowed with sufficient strength to warrant him attempting farm work at all, he

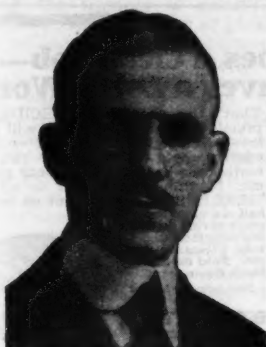
need have no fear of making a comfortable living at least while trees are coming into bearing age."

This was written a good many years ago and conditions are so much more favorable this year that there is no comparison. With the great demand, and tremendous prices paid for war crops, the owners of land may plant young orchards and figure on making a good big profit from the land during the next few years, until his trees come into bearing. Whether the war lasts or not, farm crops will bring high prices for a number of years to come, according to the judgment of men who have carefully studied conditions. After a few years, when the trees come into bearing, the owner will have received good returns from his land and brought his orchard into bearing at very little cost. If the land is taken as a whole and the profits from the intercrops considered, the owner has made this land produce a bearing orchard and at

the same time a very handsome income.

From my observation of orchard conditions and fruit market conditions I believe Dr. Whitten is absolutely right when he says: "There never was a time when an orchardist could put out an orchard with as fine an outlook for profits as now. Well sprayed, well pruned, and well managed, an orchard yields the most profitable crop of any Missouri farm product. I could mention instances galore of handsome profits from Missouri orchards in recent years, since men have begun to grow good dessert sorts, spray, prune, grade and pack well and adopt modern methods."

Foreign markets are now calling for more fruit, and after the war there will undoubtedly be a largely increased export trade. Those who have orchards growing should see to it that first-class marketable fruit is produced. Spray, prune, fertilize and cultivate. Grow fruit that will stand the market tests, and that will bring top-of-the-market prices. If extra land is available it will pay to increase your planting. My belief is that the most profitable days of orcharding are in the near future."



Paul C. Stark

first-class fruit. Our country has learned to eat more fruit, as they have learned of its real food value, in addition to its benefits to the health.

In this country there are great numbers of bearing fruit trees unsprayed and unpruned, which produce no crops, or crops poor in quality which cannot be kept during the winter. Most every farmer has a small orchard on his farm. The ones that are properly cared for produce good incomes; the ones not cared for produce very little or none. Those who understand, and have had experience in spraying and pruning, should pass this information along to those who have not had this experience.

Growing Crops Between Tree Rows

It is a recognized fact among practical and successful orchard men, that the growing of cultivated crops between the tree rows in the young orchard is a benefit to the trees and a profitable practice. This year of all years it is the duty of those who have young growing orchards, or who are planting new trees, to use the space between the rows for the growing of cultivated crops. By following this plan, the land between the tree rows can be made to produce a handsome income, especially by the growing of so-called "war crops"—cultivated crops that are most needed and will naturally bring highest prices.

I have seen and know of many young orchards planted last year, where the profits from the cultivated crops between the rows have in many cases almost paid for the land, as the space occupied by the young trees was a very small percentage of the total acreage.

The cultivation of the crops between the rows also cultivated the young trees, and as a result they have made splendid growth, and with the labor supply throughout the country short it behooves us to make one operation do the work of two wherever we can. The cultivation of the intercrops and the cultivation of the trees at the same time accomplishes this result. While writing this article I received a letter from Dr. J. C. Whitten, Dean of Horticulture of the Missouri College of Agriculture—one of our best known and most practical horticulturists. Dr. Whitten's letter has so much good advice and experience that I am going to quote it for the benefit of our readers:

COLUMBIA, MO., January, 13 1918.

MY DEAR MR. STARK—I believe it is the proper commercial plan to grow some cultivated crop in young orchards. It insures better care of and attention to the trees, by paying for the work before the trees yield profit and by making the worker see them often while he is handling the crop, and insures better soil conditions by the cultivation and any fertilizer applied to the companion crop. The young orchard must have tillage of the entire area; tilling a companion crop with it kills two birds with one stone. That is war economy. The trees use very little soil or room until they reach bearing

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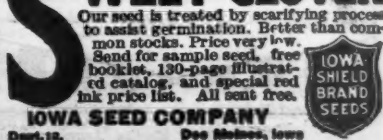
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Bracing Bearing Apple Trees

By A. E. Murneek, Iowa

Bracing or propping fruit trees is often said to be one of the "minor operations" of the fruit grower. I have braced trees of various fruits and of various ages for a number of years and most sincerely believe that it is really a big operation, and costs like everything both in time and money, especially when the trees are of large size and well loaded with fruit. Making a ducking view through an orchard after it is propped, reminds one of the poles of wire entanglements set to protect a trench. And because of cost and labor, it is indeed worth such a description.

A few years ago, however, I managed to change quite radically this work, and face it now with much less anxiety than before. It came about in this manner. When the season for propping approached once more, I simply halted in the work, looked around and found a way to simplify the labor. New lumber had to be ordered for additional poles and to replace old ones that had been broken the year previous. This was not quite pleasing to me. I gave a new jerk to my belt, filled my pipe, put my hands in my overall's pockets, stopped for a moment before a heavily laden apple tree, and allowed the wheels to go around under my red hair. "Why, of course it can be done," I said to myself. I found a way out.

How I Brace Trees

At present I have discarded loads of poles save a few long ones. These I tie in the center of the tree to the main stem, especially when the tree is an open-headed one. This is so natural that I wonder why I did not find the idea before. The pole simply extends the main stem, to which the branches can then be tied and supported. By doing this we are simply returning the "backbone" to the tree, which we have robbed it of due to following an open-center pruning and training system.

Trees that have been allowed to grow with a leader, or such as exhibit strong, erect branches, can be braced by tying the drooping branches to those in the center of the tree. This is a natural way of equalizing the tension in the tree produced by a heavy load of fruit. The excessive burden is spread evenly over the whole framework of the tree.

This system of bracing has worked well with almost all kinds of trees, except the very large ones. The latter I find require more or less propping from the ground. With the assistance of a strong lad, I have tied and braced all kinds of fruit trees in one third the time and at one fourth the cost of the old way of propping from the ground. I use an ordinary strong, cheap twine or cord for this work. Once tied, many of the branches remain supported for two or three years, depending upon the grade of cord employed.

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To make an ideal, cheap, lasting label for fruit trees, etc., take scraps of good asphalt roofing paper, cut into strips three inches long by one inch in width. Take an awl or reamer and write the name of the variety on the asphalt label. Use sufficient pressure to cut nearly through the label. Then with the awl make a small hole through the end of the label.



Now take brass wire, about the thickness of store string, six inches long. Put this through the hole in the label. Give it a twist or two, then slip the loop over the branch of the tree and twist the two ends sufficiently, then give the large loop a squeeze or two. This loop opens up as the branches expand, and there will be very little danger of the wire cutting into the growing wood.

To cultivate a garden is to walk with God.—Bover.

American Fruit Grower

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Saving the Plum Crop

By D. H. Morris, Michigan

As it is the time of the year for spraying fruit trees I would give my method of saving the plum crop from the attacks of the curculio. The first treatment when the buds begin to swell is to fumigate the trees with old leather and coal or gas tar as follows: Take a shallow basin, a wash basin is the best, put a bail on it so that it will swing easily and attach it to a pole of sufficient length to reach the top, or nearly so, of the tallest trees, and put enough live coals in the basin to insure a good fire. Then cut leather in small pieces and lay them on the coals and then pour coal tar on the fire. Push the basin up among the branches and be sure that all of the branches are well smoked. Then when the blossoms are well out repeat the same process omitting the leather. This may be done the second time before the blossoms fall or directly after.

I have practiced this method with success and always have a crop of good, perfect fruit. Some plum growers jar the trees and catch the insects on a canvas spread under the tree, but this method often bruises the bark, and then one does not always get all of the insects as they are very tenacious, and in falling often catch and cling to the lower branches and are soon ready for further depredation. By the fumigating process every insect is treated to a smoke. This method should be done early in the morning or in the forepart of the evening, just after sunset, when the dew is on the leaves, as the odor will cling to the foliage.

The smoking will give better results right after a drizzling rain when there is no wind, as the smoke will form a thick, heavy cloud and will remain, if the foliage is dense, for a long time. There are many other methods given by fruit growers for getting rid of the curculio, but many of them are quite costly and often detrimental to the trees. Owing to the prevalence of black knot, plum raising is nearly a matter of the past in this part of Michigan. A few years ago there was a state law enacted that imposed a penalty on anyone that neglected to cut down their trees that showed any infection of the black knot, but the law was never rigidly enforced, and the result was that plum raising is nearly impossible except where the trees are given the most diligent care.

TRACTOR PLOWS DEEP

It is almost as unnecessary at this day to point out the advantages to the farmer of using a tractor as it is to advocate the housing of chickens in winter or the good breeding of stock. A few questions still remain in the farmer's mind as to the advisability of his becoming the owner of a tractor. Can he afford the initial outlay? Is it so difficult to operate and so apt to get out of order that he will waste more time than he saves by its use? Is his land so steep that it will not work satisfactorily?

We predict that not many seasons will pass before the first two questions shall have been answered, first by cheaper tractors and more general community ownership of tractors; second, by greater simplicity of operation and the greater ease with which parts can be supplied in case of breakage. More than this, the parts will not break so readily, for experience will have called attention to the weak points and special attention will be given to strengthening these, and so the tractor will be perfected.

Steep Slopes Difficult

As to the objection of steeply rolling ground, it will be difficult entirely to overcome that objection. For the farmer of level acres the obvious advantages of a tractor are so great that he cannot afford to be without one.

The saving in time and labor is immense, and as labor shortage increases the tractor will become more and more of a necessity. We are just waking up to the truth of the significant phrase, "the farm under the farm." Any well-informed man today knows that the top fertility of his soil is far from all that he has to draw from. Under the surface lie riches that must be stirred and turned before they become productive. Deep plowing is the only known method by which this valuable farm under our farms can be brought into active use. The tractor will do this kind of work quicker, easier and far deeper and better than any subsoil implement.

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The Orchard Woman and the Home

SO MUCH has been said and written about the deplorable tendency toward the city and away from the farm that it is most interesting to come into direct touch with some of the reasons which are powerful enough to overcome the charm, healthfulness and beauty of the country. We do not believe that the explanation lies merely in the lure of "the bright lights" and the excitement of city life. There's more to it than that, and while amusement is a powerful magnet, the average country boy or girl does not lack it to any deplorable extent except in peculiarly isolated communities.

The main thing that induces both old and young to abandon the farm is the lack of certain conveniences and comforts, and it is a thousand pities that a more definite effort is not made to overcome these, for, with the diminution of typical farm hardships, the restlessness of farmers, of their wives and children, will be greatly diminished.

We have this month several letters which seem to give an insight into to some undesirable but not irremediable conditions, and the more of these letters we get the better chance there will be of overcoming the conditions referred to.

School Troubles

Editor of AMERICAN FRUIT GROWER:

For the mother of several children one of the first questions to be asked on moving into a community is, "What are the school facilities?"

Sometimes they are sadly poor and I know of more than one family that has given up the prospect of raising their family on a farm, though from every other standpoint the country is so superior to the city for children.

My own neighborhood is blessed with a good school; and it is possible for boys and girls to obtain a standard high school education right at home. More and more this is desired by the little people themselves; indeed, often they are far more ambitious for themselves than their more conservative parents are for them. Our boys go through the high school and then decide to take an agricultural course. Not a few of the girls pass on to the normal and thus fit themselves to help solve the big question of rural schools. So far so good, but there is one great drawback to this school. It attempts to cover too large a territory.

Two of my children are small and the only way they can get to the school is in the school wagon which makes its rounds very early in the morning and does not return my tots to their home until after dark on winter evenings.

The little ones are unduly tired out by this long day, and I am not greatly in favor of these long rides for other reasons. Hours are passed in the wagon by a large number of children with no supervision save the very casual and not very wise oversight of the driver. A deterioration, at least in manners, is too apt to be the result. Health is not benefited and during the worst weather many days are lost because I cannot expose them to the long, cold and damp ride.

What remedy can be suggested for this?

I believe there should be a central school for all children of a suitable age, but for the smaller ones who should by no means spend the whole day there, it would appear wiser to establish a number of small, or one-room schools, where a single teacher could look after them and send them home earlier.

Concentration has undoubtedly many advantages, but in such cases as this it may be carried too far and this aspect of the matter does not appear to appeal to the school boards who are all for one large building with the consequent economy of operation.

What are the more advanced rural communities doing about their schools?
MRS. J. C. MATHEWS, Ohio.

Community Laundry Wanted

Editor of AMERICAN FRUIT GROWER:

The interest you appear to take in all that touches the life of the fruit grower or farmer encourages me to make use of your columns to ask for the benefit of the experience of others in the matter of laundries for a country neighborhood.

Our community is well-to-do and many of the families are in a position to "put out" their washing. We operate a large fruit farm and one would think that it would not be difficult to find willing laundresses among those whose means make it imperative that they should add to their incomes by working for others.

The theory, however, fails to work out. Homes are scattered and often a half-day is wasted hauling the wash in a cart over a bad road and another half-day in bringing it home again, for the people who are willing to wash do not, as a rule, live on macadam roads near the center of the community. And after all this trouble the work is very poorly done and not dependable. I hear similar complaints from all my friends.

It has occurred to me that here is a condition calling loudly for the establishment of a community laundry. Have any of your readers experience with such a laundry in a rural neighborhood? If so will they kindly write what information they can give as to cost of installing and method of forming the association and of operating the laundry?

MRS. T. P. DAWSON, Virginia.

Who Wants to Pick Fruit?

Reports from many sections on the girl and women fruit pickers of last year show that the experiment was in the main so satisfactory to both pickers and employers that it will surely be repeated on a larger scale next year. The obvious advantages on each side were, for the fruit grower, a supply of labor in the rush season unobtainable in any other way, and for the pickers there was the country outing which built up their health without the usual drain upon their pocketbooks, the satisfaction of doing a patriotic act, and of proving that they could equal men and boys in this particular branch of farm work.

It is not too early for those who wish to repeat last season's effort, or for those who anticipate spending some months in this way next summer, to begin to lay their plans. Groups of girls who would be con-

genial company for each other should get in touch with fruit farmers in the locality where they wish to go.

The girls are not confined to any particular class, and the young woman who made a record as a cherry picker for J. A. Hepworth, Milton, N. Y., was found to be the daughter of a bank president. This active and energetic girl picked in one day 149 pounds of cherries as against an average day's work of 80 pounds.

Another good reason for starting early to "place" themselves is that the farmers who know beforehand what they may count on will make better preparation for their reception. Each group of girls needs a cook and an older woman as chaperon and housekeeper. Arrangements for these may be made either by the girls themselves or by the farmer for whom they expect to work.

The Battalion of Life

Not yet have our American women formed themselves into a battalion of death on the battle field. We can imagine no emergency which would make such a step advisable. But in every quarter patriotic women are entering what may be called battalions of life. To women belongs the privilege of giving life, and to them the preservation of that life seems of greater importance than it probably does to most men.

The biggest battalion of life in the world is the Red Cross. Day and night, year in and year out, doctors and nurses struggle against the dark forces that would snuff out the breath of life. There are hundreds of other smaller companies that are working heart and soul in the same cause. Not all of this effort has been called out by the war, but a tremendous stimulus has been given by its crying needs, and women everywhere are responding to the calls that come to them even from strange quarters where no women have hitherto found place.

In the fields and orchards there have been crews of young women and girls. They were helping in the great work of securing abundant harvests. Who ever thought that a girl, not even brought up in the country, would go out into the fields and drive a farming machine? We didn't even think she could; but she has done it, and not only in America. As we were the last of the great nations to enter the war, we have followed in many places where others have led, because the emergency was first felt in those lands where normal conditions had longest been subjected to the abnormal strain of war.

Women are studying, as never before, the science of economical cooking. They are saving so that the men abroad may eat and keep well and strong. Is there a hamlet in all the United States where the knitting needle has not penetrated? It fashions the warm things designed to keep the life in our boys on land and sea.

The enlarged field of recreational work has a direct bearing on the same central idea. If the youth of our armies are given clean, wholesome amusement they will not be apt to undermine their moral and physical health in objectionable pastimes.

Women have looked beyond the war and

are learning how to make life possible and enduring for those who shall return crippled or blinded. All trades that are possible for the blind are being studied by big-hearted women who will teach the unfortunate men upon their return. A man deprived of his eyesight may not think life much worth while if he has no occupation and must be dependent upon charity for the sad remainder of his days, but it is a well-known fact that when instructed so that they are able to read and to work their hands, the blind show a remarkable cheerfulness.

These are a few of the things that the great Battalion of Life is engaged in. It is one of the finest legions in the whole world. Do you belong to any one of its branches?

The Old Order Changeth

Change is not always good, but there is no doubt that the present change in the status of all kinds of household activities is a vast improvement over the old hit-or-miss methods. In no department of woman's work is progress more marked than in the handling of food.

Formerly a good meal meant a meal with lots to eat, prepared in a savory manner. Today more is required to make a good meal. Not more food. Heaven forbid! There used to be too much of it. But more wholesome and nourishing food. Science has stepped in and pointed the way. Everyone whose duty it is to feed a family should consider it of prime importance to learn what constitutes a well-balanced meal. Also to know how to do without costly foods and supply equally nourishing ones at half the price.

Classes demonstrating the new scientific cooking are being held in most of the cities, and for the country woman who cannot conveniently attend such classes there are books which will give the same information. A study of them will result in cheaper and better meals and improved health for the entire household.

Buy an Incubator

In spite of the fact that there is every indication that poultry raisers will have an unusually profitable season, it is reported that inquiries for incubators have fallen off 60 per cent from the same period last year. This is plainly flying in the face of opportunity, for an increase, rather than a decrease, should have been planned in the poultry raising business.

There is still time to reconsider if you are one of those who have hesitated. You will see that the shortage above mentioned gives an added brightness to the prospects of the faithful few who will raise as many, or more, chicks than ever this spring. You will see also that if you are among these faithful ones you must make your order for incubators and all poultry equipment without delay. Remember that freights are slow, and make out your order at the very earliest opportunity. This will be a big year for you if you keep your eyes open and your chicken yards full.

It is the will and not the gift that makes the giver.—Lessing.

Adventures of Bud Pippin and Simon Spray



Simon Spray says it looks like a good apple year—There's a Bud on one of his trees

HOW AND WHEN TO SPRAY

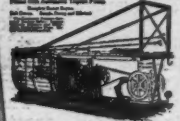
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Those fruit trees of yours—Those vines, bushes and shrubs—Those garden plants and vegetables—How about them? You are certainly going to spray this year so that your fruit and vegetable crops will be right up to the limit. This year of all years bins must be filled, cans and jars must be used, markets supplied, and every bit of food preserved in some way for home consumption next winter.

This issue can't be side-stepped. You can say next fall "If I had only of sprayed." This excuse will be a shallow one. The thing to do is to get ready right now and when the time comes, do like the professional fruit grower or gardener, get a good Spray Pump—a MYERS if you please, and use it—a Myers Knapsack, Bucket, Barrel or Power Pump, according to your spraying requirements, for the MYERS Line is a big and proven one, and all styles are fully guaranteed and will give excellent spraying service.

Note illustration of the new Myers Spray Pump Catalog—No. SP18—64 pages—showing the entire line of Myers' Spray Pumps and Spraying Accessories and chock full of reliable spraying instructions and late formulae for spraying mixtures. Write today for copy and name of our nearest dealer, and Spray Myers Way.

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Elderly Men Should Plant Fruits

By F. E. Kinney, Vermont

I have been sitting by the window for some time watching the light, feathery flakes placing an eiderdown blanket around the trees that Mr. Green sent us from his nurseries. They have been well fed and cared for, and have on their mouse guards, and seem to me to be safe and contented to slumber for the winter.

I realize from a growing tendency to look back into the past, as well as from my whitening locks, that I am an old man and probably more or less childish. But I am writing this letter to men who are old, hoping to induce some of them to set out and care for fruit trees.

The young men are taking our places in active life, as it is right they should, and we old men, if we would have the remainder of our years contented and happy instead of morose and barren, should have something for a hobby. I believe this is a vital necessity for an old man, and small fruits and trees are a bobby specially adapted to those of our age. It gives occupation to the mind and the moderate exercise suited to our years, and last, though I really count it the least, the money returns are liable to compare favorably with those of our more strenuous years.

I frequently hear old men say, "I am sorry that I did not set out trees when I was younger, but I am too old now. They will never do me any good. I won't live to see them bear fruit." Stop a moment, please, and let me ask you if this is in accord with your life so far. Haven't you and your wife denied yourselves many things for your children? Don't you want them to stay on the old farm that is so dear to you? Isn't it rather bare of fruit trees that you didn't get time to set out while you were working so hard to pay for it?

I believe that you now have one of the best opportunities of life, the leisure to put out and care for fruit. This is, I think, especially an elderly man's proposition. I am not speaking of a commercial orchard, but the average home farm orchard.

Send a postal for a catalogue, when issued, and on receipt of it make out your order, and, if you can, get your neighbor to go in with you on a club order. But send in a small order, anyway, and get started in fruit next spring, not a year or two from then, as that usually spells never. You won't need to use land that you can cultivate. Set them in what would otherwise be vacant land. Nearly all farms have it, but at least set a row each side of the road, as advocated by the AMERICAN FRUIT GROWER. By the way, you should take that magazine if you don't. If you do, you know it.

I am not advising you to start on a big scale. I didn't. But if you will start I'll risk but what your farm will soon have a lot of fruit trees, and if at any time time hangs heavily on your hands you can use up a lot of it looking for a man who is sorry that he put out trees and took care of them.

Money paid out for good trees is not spent, but invested. And a good, safe investment it is at better than 10 per cent.

I have known Charles Green's trees for thirty years, and they have invariably been fine trees, always true to name and most reasonable in price, and so well packed that they arrive in fine shape even so far away as Oregon. I would like to tell you the satisfaction that my first small order to him has given to me and my family, but this is already too long. I'd like to make it a continued story, but you see he doesn't know that I am writing it, and I don't know that he will print it.

IT PAYS TO SPRAY

The results of several years of demonstration experiments conducted by the Missouri College of Agriculture at Columbia, show that well managed orchards yield the largest profits of any Missouri farm crop. Orchards properly sprayed and managed show anywhere from \$100 to several hundred dollars net profits per acre, while neglected orchards ranged from exactly nothing to \$20 per acre, which is hardly enough to pay interest.

Another good result of proper spraying and cultivation is that the well kept orchards show far greater ability to hold a set of fruit during adverse weather conditions in the early season, than do those orchards which have been weakened by neglect.

My Book

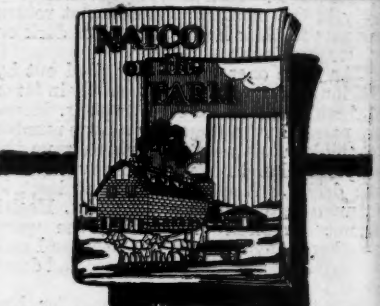


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SPRAYERS

Artillery for the Food Producing Army

Americans are now in the trenches in France where the "Big Berthas" roar. In the meantime, millions of home gardeners, fruit growers and farmers are getting their artillery ready for the food producing campaign—an important preparation for winning the war.

Probably every reader of the AMERICAN FRUIT GROWER knows that it pays to spray. But this year it is more than a question of profits. Spraying will bring crops safely through to maturity and insure full yields. It will furnish food for fighters abroad, and for millions of war-workers at home. Be sure to have your artillery loaded and in position for the battle against the bugs and blights which are sure to attempt an invasion this summer. Victory is assured if we all do our part, as well as the boys "over there" do theirs.

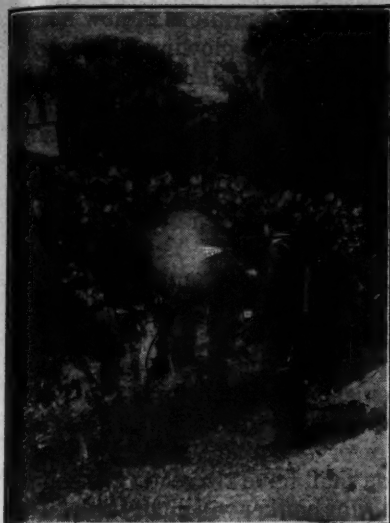


Fig. 1. Prevent mildew and grape rot by spraying.



Fig. 6. A hand-operated sprayer for use about the home and garden.

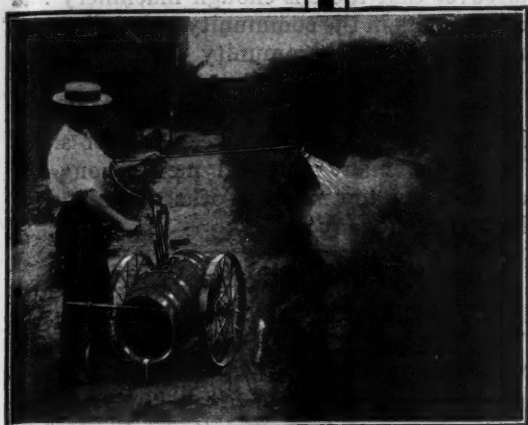


Fig. 2. Fighting asparagus rust with barrel sprayer.

Sprayers for the Garden

Probably every home gardener could make good use of the small atomizer sprayer shown in the lower left corner. This sprayer can be quickly filled, easily handled and taken anywhere. It is just what you need for keeping the plant lice off the rose bushes, for spraying the cabbage plants in the cold frames, and for many other small jobs.

For bigger jobs in the garden and poultry house, one needs a bucket or knapsack sprayer. The knapsack may be moved about readily, and is made in two styles, operated by continuous pumping or by compressed air.

Such an outfit will be in almost constant use from early spring to late fall. Use it for watering the young plants in the cold frames, for preventing blight and insect ravages in the garden, for disinfecting the brooder and runs, and for spraying the fruit trees in poultry yard.

For very large gardens or where several home gardeners co-operate in buying equipment, the barrel sprayer is practical. (Figs. 2 and 3.) Such a sprayer will not only protect a big garden, but will care for a fair-sized orchard.

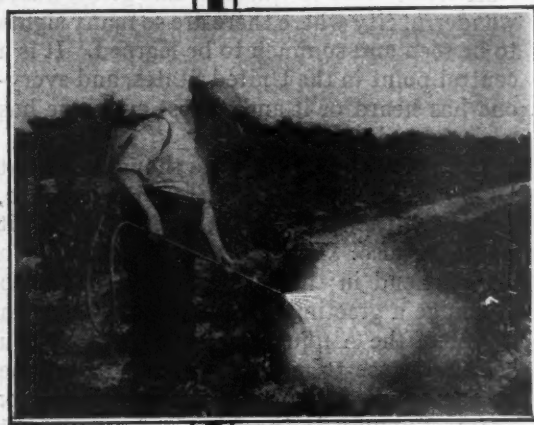


Fig. 7. Spraying an intercrop with a knapsack outfit.

Sprayers for the Orchard

Most orchardists have use for two spraying outfits, a large power outfit for the heavy work and a barrel sprayer for odd jobs. Now is the time to go over your spraying outfits and see that they are in readiness for immediate service. Any missing or broken parts should be replaced at once.

Sprayers for the Field Crops

Those who specialize in growing potatoes and other truck crops need a horse-drawn sprayer which will cover a large acreage quickly. These may now be had in many sizes and styles, covering from four to ten rows at a time. One of the most efficient is the engine-driven sprayer (Fig. 5) which covers a wide sweep of ten rows of potatoes or five rows of canteloupes, and other wide-rowed crops. It is operated by a $4\frac{1}{2}$ h. p. air-cooled engine which may be readily removed and used on the engine potato digger or for pumping, sawing and other odd jobs about the farm.



Fig. 3. Spraying a young orchard with a barrel sprayer.



Fig. 8. Four-row traction sprayer at work.



Fig. 4. A hand-sprayer is needed around every place—big or small.

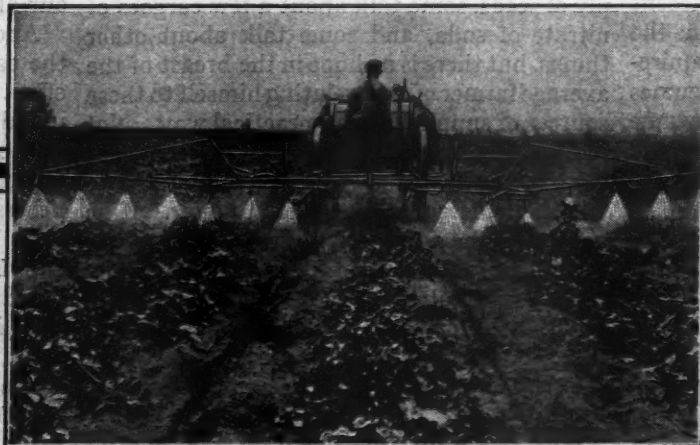


Fig. 5. This engine-driven sprayer will cover an acre in six minutes at 200 lbs. pressure.



Fig. 9. Protecting grapes with a compressed air sprayer.

GREEN'S American Fruit Grower

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Come to See Us

At some time in their lives the majority of Americans come to Chicago, this great, busy, wonderful city where there are so many sights to be seen and so much to be learned. It is a central point in the United States, and everyone has heard of it and almost everyone has wished to visit it.

Sometimes, along with the thought of what a fine thing it would be to visit Chicago, comes the thought, what a lonesome thing it would be also. Perhaps you do not know a single friend in the big city with whom to exchange a greeting. If, however, you are a reader of the AMERICAN FRUIT GROWER you have no cause to feel this. When you come to the city remember that the AMERICAN FRUIT GROWER is the friend of every fruit grower in the States. Remember also that its offices are at 329 Plymouth Court, and that we shall be glad for you to make these offices your headquarters during your stay. Have your mail addressed in our care.

Come to see us. Tell us what you like about the journal. Tell us what you don't like. Let us hear your views and your problems. Let us get together and help each other. Once we get acquainted the rest will follow, so here's your welcome extended to you in advance by the staff of the AMERICAN FRUIT GROWER, 329 Plymouth Court.

Raising Feed for Stock

The time for planting the side-line crops on fruit farms is at hand. The national need is very great—it includes international need. This is the year for fruit growers to give up their cloaks also and to walk the extra mile. Plant feed crops. Peas between the apple and peach rows will afford much hay and the orchard will be benefited besides. Recent experiments claim that corn between the young trees is much less severe in its requirements than grass sod. Certainly, legumes may be safely grown, and plenty of legume hay—all the stock will eat next winter—will make two barrels of corn outlast three without ample hay.

"Help is scarce and what can be had wants big pay and light work," someone rises to remark. That is so, and also a lot of other things. It is easy for one to argue himself to a standstill these days. If one believed all he hears about costs of this and costs of that, he would reach the conclusion that the surest way to profit this year is to do nothing. Be not deceived, idle lands will not grow profits.

Farmers Want a Leader

The crop season is at hand. Very little winter work has been done. Sod that was to be turned for summer crops has not been touched. Most of this kind of acreage will not get planted. The first draft took 212,000 out of agricultural pursuits against 190,000 out of industrial pursuits. The higher money wage offered by industrial enterprises have probably taken another 212,000.

And these drafts are all the more taxing on rural production because they represent picked men. Farmers will have to try to maintain rural production with labor the national service would not have. A heavy burden suddenly falls on old men and women, young children, and those rejected by the draft officials.

Increased efficiency, however, would partly recompense reduced farm labor. But precious little has been done to make farm production more efficient. National and state bulletins are mere proclamations. Farmers have always known that they are expected to make the brick. But now they are told that they must gather the straw also. Can they manage this extra task? They could give a better account of themselves if the rural resources for production could be better organized. A great leader is needed and wanted.

The mood of all classes of farmers was never so favorable to rural organization for increased production. The world-wide demand for more food has enabled them discover and rightfully appreciate their place among the workers of the world, and their love of country has kindled the burning desire to do all that is expected of them. They are one in heart. They now want to be one in effort. Where is the leader?

The government knew how to make an inventory of the industrial capacity of the country, and when the emergency of the great war arose, it knew how to hand out the national work to the national industrial establishments. When the government needed more men for the army and navy it knew how to get these men. But there is no convincing evidence that the government has any system, or contemplates the organization of any system, which is designed to create the same assurance with respect to the nation's food supply as is felt with respect to armament and munitions for the army and navy. If the government can manage the one, why cannot it manage the other?

There is some talk, to be sure, about a supply of seeds, some talk about a few cargoes of nitrate of soda, and some talk about other things, but there is no hope in the breast of the average farmer of ever relating himself to these sources of supplies in any practical way. Not one farmer in a thousand has the remotest idea as to what he may do to avail himself of what aid the government has to offer. If he acts at all, he will probably write to his Congressman, and in due time will receive a double handful of seeds of something and a blank form for his report to the government on the adventure. Many farmers feel as if they are about to commence a march into the desert.

The charitable sentiment of the country has been wonderfully searched out recently.

The Red Cross entered millions of new homes in a single month. The glowing red cross in millions of farm windows tells the story of a remarkable achievement. If the Red Cross can search out and organize the charitable sentiment of the land, why cannot the Department of Agriculture or the Department of Food Conservation search out the productive sentiment of the land? Yes; why, why?

The time is short but something can be done. There is yet time to get the farmers of every magisterial district together. Ask them to bring pencil and paper. Let one of their number call them one by one. What did you produce last year? Can you manage an extra acre or two this year? Why not? No seed. You shall have the seed. No money for fertilizer. Our banker will gladly help. One by one difficulties are raised and removed. No extra drills and harvesters to buy. They discover that there is enough machinery and implements in the community to handle twice as much as the community ever produced. These are instances.

Let the government direct all these things, but let the government keep out of sight. There are many splendid men among the officials, but too much of other work is done behind mahogany desks.

Fruit and the War

The national slogan "Food Will Win the War," is a rallying cry to fruit growers as well as to grain and stock farmers, for only the combined harvests of all kinds of food production can be called the nation's food supply. It binds a special obligation upon fruit growers to perform carefully every operation necessary to bring all the set fruit to perfect maturity and to gather up the fragments that nothing remain.

The condition of the market next summer and fall cannot be forecasted now. The market may be active or it may be dull. The war, not the market, is the main factor. Precious lives are being sacrificed to make the world safe for democracy and democracy safe for the world. The reasoning by which the sacrifice of millions of lives for right is justified does not exempt property or production from sacrifice. While fruit growers may look to the coming harvest for reasonable profits for their effort, they should cheerfully undertake to market all off-grade fruit for the bare cost of handling. For every extra barrel and every extra basket of fruit that is taken for the home tables of the land will release a definite amount of other food products for our allies.

And fruit growers can give further aid to the cause of liberty by making a thoughtful effort to make home production meet the demand of home consumption as far as possible. Hitherto, fruit growers have not been particular about raising the feed for the live stock necessary to fruit production and home-keeping. Many have honestly believed that such supplies could be bought for less than they could be produced. While this belief probably is not justified by the facts, the higher demand of patriotism is for production of home feeds even at the cost of the same feeds on the market. The awful stress of the times urges every rural producer to get out of the food and feed market and to stay out.

Apple Prospects Bright

Not in many years have the prospects of fruit growers been brighter than at the opening of the year 1918. Prices for fruit have been, and are, satisfactory to the grower, and what is more, there is every reason to believe that for many seasons to come the demand will be greater than ever before.

The devastated orchards of Europe will produce nothing for a very long time, and it will be the fault of American growers if they do not find themselves in position to supply the lack after the war.

Practically no plantings of commercial size have been made in this country of late years, so there is likely to be a pronounced shortage of fruit unless we growers throw ourselves wholeheartedly into that pleasing combination of patriotism and profit which is our manifest duty. Sometimes, indeed many times, it is duty combined with sacrifice that is demanded of us, and we count ourselves fortunate that in doing our full duty to our country and to our fellow men everywhere, we are at the same time doing what is best for our own interests.

Tell Your Neighbors

We are daily receiving many letters which gratify us extremely. They tell us how much our subscribers like the new AMERICAN FRUIT GROWER. Do you like it too? Do you find the articles helpful and interesting? If so tell your neighbors that in the AMERICAN FRUIT GROWER they will find a first-class fruit journal fitted to the needs of fruit growers in every locality of the United States.

We are pleased to have met with your commendation so far, and it is our wish and intention to continue to deserve it, and to enter more and more into close touch with the needs of the fruit grower and to give him all the help and information of which he stands in need. In order that we may do this to the greatest advantage we ask that our readers should write to us constantly, giving and asking advice, making suggestions, putting questions. It will be to our mutual benefit if this is done. It will also benefit us and your neighbor if you get him interested in growing fruit and encourage him to become a subscriber to this foremost fruit journal.

Welcome the Stranger

Many city people will offer to help with farm work. Many of them know nothing about farm conditions. Do not sneer. How would you and I look in a millinery shop or at the paying teller's window? Don't condemn a fellow because he hails from the city. The fact that he wants to come to the country shows that he is right bright. Give him a chance. City trained people are sharp-witted. Wanting to learn farm work is half of learning.

National, state and county agencies will be organized to help the farmers get help both for regular and emergency work. If you need help and cannot find it near you, use these agencies. You may draw a blank. If you do, blame the blank, not the agencies. These have no way of testing the farm efficiency of

those applying. They merely register names for the convenience of both applicant and farmer.

Show a Friendly Spirit

A phrase that sounds familiar is "the friendly farmer," and we think the farmer has honestly earned this enviable reputation. He is friendly spontaneously. He seldom stops to think whether it is his duty to be so, it just comes naturally to him to help out a neighbor who is in any kind of difficulty.

But though the farmer is friendly he is not always thoughtful, and if his neighbor is not what one could call "in difficulties," it does not occur to the farmer that he may still be in need of kindness of a less material sort. This applies particularly to strangers who come to live in a rural community.

Have you ever been where you knew no one, and felt there was not a soul near at hand who had any particular interest in you? Well, if you have been there, you know it is a lonesome and homesick sensation. And that's just the position of the newcomer, until the old members of the community have shown a friendly spirit.

Think of all the efforts that are being made at this time to keep our boys in the army from being homesick. That shows we realize what a mean feeling it is. But we have not perhaps taken into account that the family on the next farm may have just the same little gnawing pain in their hearts as they look out over a landscape where even the trees and fences are strange and where no familiar face smiles a greeting.

There was a fine old English custom of the farmers in a community giving the newcomer "the compliment of a day's plowing." That's substantial kindness, and we may be sure that the stranger never forgot to hold in peculiarly kind remembrance those who came to welcome him thus.

Perhaps it would be too much to expect now, when labor is so scarce and high that the farmer has to hustle to get his own plowing done, that all the men of a neighborhood should get together and turn over another's land, but other deeds of kindness will surely suggest themselves to anyone who stops a moment to think how he would like to be received were he the newcomer. A hearty grip of the hand outside of the church door, a smiling recognition of his presence when he passes on the road (for happily there are still many rural communities where a formal introduction is not a necessary precedent of a bow and smile), a pause to exchange a few words that denote welcome, all these things will go far to make the newcomers feel at home.

Remember that until a person does really feel at home in a community he is not a part of it. You cannot expect any public spirited actions from one who is not in touch with local needs and ambitions, who does not instinctively say "we" and "our" when speaking of the place. You'll not get any benefit from your new neighbor until you have helped him to "wear off the NEW," and to enter into that feeling of local pride which alone lifts a neighborhood into a worth while position.

Organization and Prices

How organization affects prices is shown in an article by Harris Weinstock, State Market Director, San Francisco. He is in a position to know whereof he speaks when he tells of the disastrous fluctuation of prices in the non-organized farming and fruit industries.

His present theme is the recent over-production of onions. The growers of this product have never been organized and, in consequence of ignorance, they overplanted to such an extent that the onions produced in California became a drug on the market. When the State Market Director was at last called in to the aid of an extreme situation, he could do little to help. Even the markets of Belgium and France were not demanding onions, for both of these countries reported a plentiful crop.

He asserts that at times 15 cents per pound has been paid for onions and that at other times the consumer has been begged to take them for one cent per pound. No single organized vegetable or fruit industry has been subjected to such fluctuation.

Knowledge is power and the kind of knowledge needed by the producer cannot be obtained save through co-operation. To quote Mr. Weinstock: "As an individual the producer is helpless and not even the state can be of much service. He is at the mercy of a shifting market, but the consumer does not reap the logical benefit. The organized producers, on the other hand, are being assisted and guided by the state at every turn whenever perplexing conditions present themselves."

The Little Busy Bee

We were taught in nursery days that the way the little busy bee improved each shining hour, was by gathering honey all the day from every opening flower. Now it becomes apparent that honey-making, delightful as it may be, is but a side line, as it were, and that the true place of the bee in the economy of nature is as a pollinizer of fruits and vegetables as well as of flowers.

Fruit growers do not sufficiently realize the important part played by these active creatures in helping the fruit to set on the trees. An example of the appreciation in which the service of the bees is held by large commercial vegetable growers is to be found in the immense green houses where Davis Bros., of Iowa, raise cucumbers for the market. Every 200 feet a colony of bees is placed, and their flittings from staminate to pistillate blossoms are necessary to anything like a full set of cucumbers.

Does this cap fit any farmer reader? An article on "Household Pests" starts out with: "HUSBANDS: probably the commonest and best known of all household pests. Each year complaints are received from people who are worried by the activities of these persistent animals, one of which has taken up its domicile in almost every dwelling, refusing to be driven out by any ordinary treatment known to housekeepers. They spill gravy on the clean tablecloths, drop ashes on the rug, forget errands, come home late, snore and are cross before breakfast."

Without hearts there is no home.—Bryan.



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We have been builders of spraying machinery since 1884. Every machine that goes out from our plants today is backed by that 33 year reputation.

Bean Sprayers—for 33 years—have been built up to a rigid standard. Men who have bought one, have later bought as many as twenty more as their bearing acreage increased. Some of the country's largest ranches

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Inventor
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Kind of Fruit Grown..... Number of Acres.....

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Kindly Mention American Fruit Grower when writing to Advertisers

Bees for the Farm Woman

By Lois E. Rowe, Maine

I am very pleased to see the AMERICAN FRUIT GROWER's new department, "Bees for Profit." Too few farm papers have a bee page and very few one conducted by such an authority as Mr. Root.

I wish every farmer's wife or daughter knew that B-E-E-S spells two words—Profit and Pleasure—and that's something that doesn't occur often in the women's share of the farm work. I wish the women knew because bees, like biddies, seem more a job for them. The busy man doesn't want to bother.

Farm women are busy, too, and doubly so because of the countless little tasks the men "can't bother" with, and they may not be overglad because I suggest still another job for them, but if they don't lynch me before I have finished this, perhaps their wrath will cool a bit.

Though Busy, I Enjoy Bees

I am a farmer's daughter and, in a small way, a farmer myself. I have my poultry, bees, strawberries, vegetable garden, cow and, usually, a pig or two. I have two men to cook for, wash for and pick up after, a house to take care of, a baby to tend. In summer I can enough vegetables for us to have corn, peas and beans in abundance until the next year's garden, besides the usual fruits, etc. Now, do I know what I am talking about when I say "busy?" Yes, and also when I say "bees."

Bees Take Little Time

In summer I keep my hives in the doorway, away from the driveway, of course, but in sight of the kitchen windows where I can glance at them occasionally without leaving my work. With blacks or cross-hybrids, it wouldn't be quite safe to leave them so near the house, but pure Italians seldom bother anyone not bothering them. Once a week I examine each hive and do whatever is needed, taking from one to two hours' time. This is all there is to the work except occasionally catching a swarm, and that takes but a few minutes if you are prepared, as you should be.

Making section boxes, wiring frames, fastening foundation and the like, can be done in the long winter evenings when there isn't so much other work waiting. An average of two hours a week through the year won't be far wrong as to the time required to care for, say, 20 hives. That isn't so very much, is it?

Both Profit and Pleasure

Now for the profit. You won't get rich overnight keeping honeybees. You won't get rich in a year. But you will make more for the amount of time and capital invested than from anything else I know of. In a good season your pocketbook will be pleasantly heavy, and I've never yet found so poor a season that I didn't have some balance on the right side of the ledger, though apiarists of long experience say there are seasons when one loses money.

As for the pleasure—when you get acquainted with the bee family you'll want to say, "I take off my hat to you." For wisdom, neatness, energy and optimism, they have 99% of humans so far behind that you couldn't see them with a telescope. The more you know about them and their ways the better you'll like them.

Mrs. Farmer, You'll Enjoy It

So, I say to you farmerettes, if you want some extra money in your pocketbook that you don't have to pry out of Mr. Man, if you want a little more pleasure in your life, a bigger appreciation of the wisdom and greatness of the Good Father and of the wonderful things He has given us, get a few bees.

One thing you should do so as to avoid mistakes and do good work is to get a good book on bees and study it. The Department of Agriculture at Washington, D. C., issues a bulletin on "Bees" and one on "Comb Honey." Both are very good. For a more exhaustive treatise, the best book I know of is "A. B. C. of Bee Culture," by A. J. and E. R. Root. This book covers every phase of beekeeping and is very interesting reading even if you are not an apiarist.

One must be poor to enjoy the luxury of giving.—George Elliott.

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Men Mechanically Inclined, Your Services Are Needed.

NEVER before has the demand for Automobile, Tractor, Truck and Aeroplane motor Mechanics been so great. Your service is needed in the Army, driving and repairing Trucks and Automobiles; in the Aeroplane section repairing motors; on our farms using Tractors; besides, remember that this country has 4,500,000 Automobiles. Thousands of mechanics who formerly took care of them are in the Government service. Somebody must take their places. It is up to you to take the places in the garage, etc., of the men that must go. Realizing these conditions I have made preparation to train men to fill these important positions. The demand for men is here. I am ready to train them. If you are in the draft come here and be trained so that you can give a special service to your Country.

WRITE FOR FREE CATALOGUE.

I have written a catalogue that shows pictures of all departments and describes my school. I want you to have it. It will tell you how I teach the Automobile, Tractor business; open your eyes to the opportunities for splendid positions at good money. This Country must have trained Mechanics. Take advantage of present conditions, write for my free catalogue. It's a trip through the greatest school in the world. Today is the day of opportunities, grasp them.



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Get Your Blue Print and Plans at once, and have your sizer ready when you need it.

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THIS FREE BOOK TELLS HOW

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SPECIAL: Better still, to get spring planting, enclose \$1.00 for our prepaid and specially selected WIN THE WAR GARDEN (suitable for family of 4) all summer and fall of peas, beans, corn, onions, lettuce (3 kinds), carrots, tomatoes, radishes (3 kinds), muskmelons, turnips, cucumbers, cabbage, parsley, squash and cucumbers; and to please the women we have added packets of Giant Flowering Sweet Peas and Victoria Anthers. Order early. Satisfaction guaranteed or money back. **GALLAWAY BROS. & CO., Waterloo, Iowa** Dept. 54 "The Biggest House with the Little Yard"

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Bee Keeping for Profit

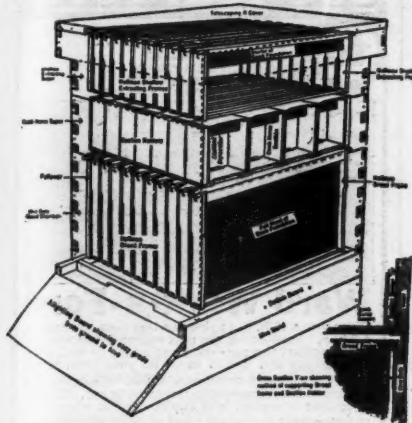


A Lesson in Beekeeping

By E. R. Root, Editor of Gleanings in Bee Culture

IN FEBRUARY we emphasized the importance of placing orders for bees, hives and other supplies at once. We also showed the hives that we recommend for the fruit grower. It is now in order to describe the hive in particular, as it is to be assumed that most of the readers of this series of articles are entirely unfamiliar with the details of construction of the modern beehive.

At this time we shall not describe the hive adapted to the production of comb honey, that is, honey in little square boxes such as one sees at the stores, as we are assuming that the fruit grower would not have time to go into the intricate details necessary for the production of that article.



A hive, with sides and top removed, showing lower story called the brood chamber, and two supers above; the lower one equipped with comb honey sections, and the upper one with shallow extracting frames. The small cut below shows an upper corner of the brood frame and how it is hung on a metal support called a rabbit at the upper edge of the end of the hive. In actual practice two supers, with foundation starters only, would not be put on the hive at the same time.

His main business will not be the production of honey nor of bees, but of fruit; the bees being kept chiefly as a means to the end of securing more and better fruit, the honey produced being incidental.

The hive for the fruit grower should therefore be one that should require as little attention as possible; one that will give a good warm home for the bees; one that will be simple and easily handled by the fruit grower, who has not the time or perhaps the inclination to study up very much on the subject of bees.

The Beehive for Fruit Growers

The accompanying illustration above shows a hive that will require as little attention on the part of the owner as any hive on the market. A fair colony inside of it will almost work for nothing and board itself, providing it has a fair amount of stores left over from the preceding winter and providing the season is anywhere near normal. It is capable of expansion by the addition of extra units and will therefore give the fruit grower as little trouble from swarming as any hive he could select from any bee supply catalog.

Primarily a standard hive consists first of a floor or bottom board, a hive body or brood chamber holding a series of ten combs in movable frames, an inner cover, and an outer cover. As the season advances and the colony becomes stronger so that it requires more room, an upper story, or extracting super, is added. Usually a two-story hive like this should take care of a colony through the entire season, but when the season is extraordinarily good the bees may require one or two extra superstories, making in all a three or four-story hive.

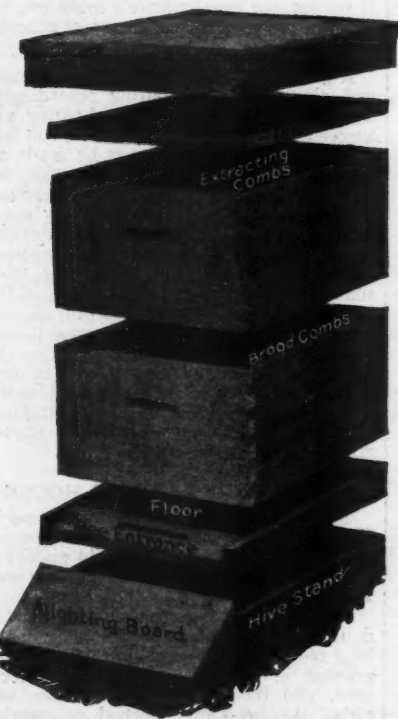
From the instructions given in February, the fruit grower by the last of March, or not later than the first of April, should have enough equipment on hand so that

he can make his colonies one, two, three or even four stories high, if the season requires them. The average colony at the beginning of the season, however, can be housed in one hive body or brood chamber. It is not necessary to add the second story until about the first of June, in the north central states. In the southern states it may be necessary to add an upper story by the first of May.

While an alighting board is not absolutely essential, as shown in the illustration, it is a great convenience to the bees, enabling them to get into the hives on cool days, and at the same time it protects the floor of bottom board from the ground itself.

As will be seen, each of the parts of the hives are in separate units, so that the size or capacity of the hive may be increased by adding one or more units as the case may be.

Mention was made of the fact that each hive body or brood chamber is supposed to have ten movable frames filled with comb in which the bees can rear their brood and store their honey. Each comb is built into a special frame that hangs in a hive rabbit as shown in the annexed skeleton view of the hive.



A hive with extracting honey super, containing frames in which honey is stored by the bees, and which is extracted by use of a honey extractor, the frames of comb being returned to the super to be used again by the bees.

Taking Out the Honey

In the old-fashioned hive of our forefathers the combs were built in a rude box and attached to the four sides and top of the hive. This made it impossible for the owner to get at the combs to note the condition of the bees. It was the custom in those days, after the season was over, to brimstone the colony and cut out what honey might be stored in the upper part. This was not only cruel, but wasteful. In the modern hive each comb is made movable so that the combs can readily be taken out and the condition of the colony can be ascertained at any time. With the modern, movable-frame hive, it is also possible to remove the combs, and cut out the honey after the season is over, giving what is known as "chunk" honey. If the beekeeper-fruit grower has a honey "extractor" he will, of course, extract the honey from the combs, getting "extracted"

honey. But an "extractor" costs money, and the fruit grower who keeps bees chiefly for pollinating purposes, and who hasn't an extractor, will find "chunk" honey every bit as palatable as extracted honey, and also saleable. The difference is in the looks.



Root bee-veil

With a modern bee veil (a bag or sack of netting) that fits down on the hat, and over the face, one will be secure from stings about the face and head. Where one is very timid he can use ordinary heavy gloves, but if one follows directions that are sent out with supplies by the manufacturers, he will soon be able to handle bees with bare hands and receive few or no stings.

In connection with the hive there should be an ordinary bee smoker, a device for blowing smoke from a slow burning fuel upon the bees. Smoke to bees is, in a way, like a whip to a fractious horse—it controls him. Without smoke it would be difficult to perform many of the manipulations in ordinary bee management. With it, the work is easy.

What we said in the February number, we now repeat: if the fruit grower has not ordered his hives, bee smoker and bee veil, he should do so at once. The hives should be on hand, nailed and painted, not later than the first of May to be ready to receive the bees.

In the April issue we will show how to put the bees into the hive. We will also give some instructions how to handle bees without getting stung. Right here it should be remarked that bees ordinarily are very docile, easily handled, and, when the directions are followed, there is very little trouble from stings.

Spraying While in Bloom

The writer has received a number of protests from beekeepers and fruit growers about the statement made by E. S. Smith, of Ohio, in the January number of the AMERICAN FRUIT GROWER, page 3, wherein he says: "When bloom comes give it another spray to destroy whatever moth eggs may be deposited in the bloom." The statement in question seems to be in direct opposition to the recommendations made by Experiment Stations all over the United States, particularly at Cornell. Where the bloom is very abundant, and more fruit would be liable to set than was desirable, no great harm would be done by spraying while the trees are in bloom; but if the experience of Experiment Stations mean anything, and if the experience of hundreds of beekeepers all over the United States has any bearing on the question, the practice should be discouraged. First, because it kills the bees by the thousands that come to the blossoms in quest of pollen or nectar; second, because it damages the delicate flower parts. Of course, much will depend upon what kind of spray is used; but the ordinary arsenate of lead of the strength generally recommended is strong enough in most cases to kill bees, and, as the writer pointed out in the January number, page 17, the bees are the fruit growers' best friends.

BEGIN BEEKEEPING

It is easy, it is profitable, it is fascinating, and in this war year of 1918 it is a patriotic duty that calls on you to help save some of the more than \$100,000,000 worth of honey nectar that goes to waste annually in the United States. Your roof, your back yard, your lawn, your orchard, your garden, your farm, afford the opportunity. Write us today for our booklet on "Beginning in Beekeeping and Beginners' Complete Outfits." We will tell you how to begin right.

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FREE—With every order I will give you ten fancy, Gladiolus bulbs. Rush your order to me right away.

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Fruit in Southern Nebraska

By D. J. Wood, Nebraska

While eastern Nebraska has an enviable reputation as a wonderful fruit region, as you go west she loses her prestige. Not so much on account of change of climate, somewhat on account of change of soil, but more because of not trying to raise fruit adapted to the soil and climate.

I have no doubt but that we are having a change of climatic conditions. Fifteen years ago we had good peach crops. Now, for four years, none. And this severe winter will probably not only dispel all hopes of fruit, but will kill many trees. I cut out half of my trees last season as cumberers of the ground.

Replace Peaches with Pears

I grubbed them out and dug deep holes, and will replace them with Keiffer pear trees, which are a sure cropper here. These holes are now full of snow, and thus I irrigate and by means of the frost, loosen up the soil deep down where I am to place my trees.

Another sure bearer here is the cherry. I see no reason why this region should not become noted for cherry orchards. We never fail in this crop and the trees seem reasonably long-lived.

When I moved to Jefferson county, and brought my stock of small-fruit plants, the old inhabitants poked fun at me for presuming to do such things here. Since then I have proved that small fruits can be successfully raised here by proper tillage.

Last season was the driest known for years. Many grapes, raspberries and strawberries died from the drouth. But that is the first case in sixteen years. Every other season has been a success. Some kinds of raspberries survived, as did blackberries, currants, gooseberries and dewberries. We had a good crop of plums. If we get our usual winter's moisture, we can replant with all assurance of success.

No Success by Guesswork

A man must study his soil and climate and plan his fruit planting accordingly, and then educated methods of tilling will succeed where ignorant negligence will fail.

I still think that this can be made an apple country if the subsoil be broken by dynamite before planting, and then the soil cultivated as a cornfield, regularly manured, and a clover crop grown at intervals and allowed to fall and decay, then plowed under, and this kept up until the trees shade the ground, and by the falling of the leaves, ideal forest conditions prevail.

We now crop the orchard, or grass it, and pasture it until the soil is as hard as the road, impervious to the water that does fall, and no nourishment is provided for the trees' growth and fruitage. No spraying, no cultivation, no fertilizer, and we expect crops!

COMMUNITY PACKING HOUSE

There's a community packing house in Thedford, Ont., which makes use of one or two novel methods that should appeal to those who are interested in organizing such a packing association in their community.

For one thing no member and no sons or daughters of members are included in the help required in the packing house. The grading of the fruit is done by local men, and the wrapping by women and girls. An ingenious method of meeting miscellaneous expenses is to use for this purpose all the money secured by the sale of culls sent to the packing house instead of returning the proceeds to the owner. This serves a double purpose, as the man who sends in culls thus pays an extra large proportion of all such expenses.

Each member has his number and this must appear on each package of his fruit sold under the name of the association. Poor quality fruit may be rejected by the association, but provided it is accepted and the purchaser is dissatisfied the number will identify the offender. As a rule such undesirable fruit must be sold wherever the grower can find a market.

GRAPE BARK SHELLERS PESTS

Old bark on grapevines shelters disease and insects over winter. It may be that these troubles will cost more next spring than to strip the bark and then spray. In San Joaquin county, Cal., it has been found that five cents per vine pays the cost of stripping. Old bark is shed readily after Bordeaux spraying.

When It's Nitrate Time for Peaches

Use broadcast 200
lbs. per acre this
Spring, at or after
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It takes Nitrate of
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have plenty of fresh vegetables for
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IRON AGE Combined Hill and Drill Seeder
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also other Bunches or Swellings. No blister, no hair gone, and horse kept at work. Economical—only a few drops required at an application. \$2.50 per bottle delivered. Book 3 free. ABSORBINE, JR., the antiseptic liniment for mankind, reduces Cysts, Wens, Painful, Swollen Veins and Ulcers. \$1.25 a bottle at dealers or delivered. Book "Evidence" free.
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Noger Pea & Bean Thresher Co., Morristown, Tenn.

Tractors Trucks and Engines



Apple Crop and Trucks

WASHINGTON'S orchards are known all over the United States—some of the finest apples on the market are grown there.

Last fall, Washington's immense apple crop had to be transported to the central packing sheds without loss of time. The work of Johnson & Anderson of Entiat, with their 2-ton truck may well be taken as an example of what will be done by trucks throughout this country next fall.

Working from 7 p. m. to 6:30 a. m. Mr. A. Johnson and Mr. A. E. Anderson set a pace in fruit haulage. Mr. Johnson wrote: "Regarding our records of hauling; will say it is pretty hard for us to give an accurate record, but have made out two daily records and will give you an idea of what we did."

"All the hauling consisted of hauling loose apples in boxes from different ranches into a central packing shed, the distance ranging from 4 to 12 miles. Started to haul the 11th of September, running one shift up to the 8th of October, running double shift from that time until the time we finished our contract. The amount hauled in pounds—2,157,080. Number of boxes—53,927. Number of days—95. Lost no time, as we would go over the truck on Sundays and oil up and tighten bolts."

"In making our trips it also consisted of hauling out empty boxes to the ranches. Would take out about 250 boxes to the trip, weighing about 1,000 pounds. So we consider that we did good work for the time we put in."

Here is their record for October 10, 1917:

	First Shift A. Johnson 7 a. m. to 6:30 p. m.	Second Shift A. E. Anderson 7 p. m. to 6:30 a. m.
Driver		
Time	60	70
Mileage	5	4
No. Trips	12	17.5
Aver. trip in dis. in miles	24,000 (12 tons)	19,200 (9.6 tons)
Weight carried in lbs.	4,800 (2.4 tons)	4,800 (2.4 tons)
Aver. weight per trip	1,000	1,000
Weight returning in lbs.	72	84
Ton-Mile	600	480
Boxes car.	120	120
Boxes per trip	7	8 1/2
Gals. of gasoline	8.57	8.23
Miles per gal. of gasoline	1 1/4	1 1/2
Pts. of cyl. oil	48	46.6
Miles per pint		

Including two drivers' wages, interest, insurance, taxes, garage rent, gasoline, lubricants, repairs, depreciation and tires, the cost of the one day's work was as follows:

Cost per day—double shift	\$17.994
Cost per mile traveled	.138
Cost per ton hauled	.609
Cost per ton-mile	.115
Cost per box	.016

EXPERIENCE WITH TRACTORS

Editor of AMERICAN FRUIT GROWER:

You ask for our opinion of tractors. There are some good tractors and there are many bad tractors. We have one good tractor and one bad. The good tractor is only six-horse power on the drawbar, but it enables us to accomplish an immense amount of work in the rush seasons.

We find that it will always do more than six horses in the same number of hours, and in the hot, muggy spring days and hot summer days, it does what it would take fifteen to eighteen horses to do, especially on broken or soft ground. We would hate very much to have to get along without a good tractor now that we have become used to one.

You ask for the disadvantages of a tractor. There are no disadvantages to a good tractor. They, of course, break occasionally, and get out of order, but not more so than any other farm tool, and not nearly so much so in proportion to the amount of work they do.

As to the cost of operation, you can do much work, such as plowing and disking, much cheaper than with horses, not considering the life of the tractor. But when we consider that we do not think it is much cheaper. But the cost of operation is of very little importance. By disking and plowing at the proper time, by thorough disking and preparation, one can easily get back in crops several times the cost of operation.

Between land in fair shape and land in excellent shape the difference in the crops might be as much as \$20.00. The difference in cost between tractor preparation and preparation by horses, is not much, if any. The main point is to get the work done when it should be done, and a good tractor certainly helps immensely in this.

Our good tractor is very light and very agile, very easily operated and tends to run straight even on plowed ground and will turn in very short space even on plowed ground. We can plow, disk, cultivate corn and pull binders. We burn

gasoline which he think better for all engines. We have dispensed with several teams as the tractor, on the rush hours, has been able to take so much of the load, and our work is always in better shape and more being done. In spite of all this no one should buy even a good tractor unless they intend to learn it and give it the attention required. They will not run themselves and are not entirely fool-proof.

POPLAR GROVE FARM CO.,
West Virginia.

TRUCKS ARE NECESSARY

The auto truck is no longer a luxury but almost a necessity for the successful Kansas farmer, thinks W. H. Sanders, instructor in farm motors in the Kansas Agricultural College.

Thousands of young men have been taken from the state for national service. At least 55 per cent of these are from the farms, or have been engaged in farm work. This creates a shortage in farm labor which is likely to become permanent as successive drafts take place, and the government is urging the few left on the farms to produce more farm products than ever before.

Much valuable time is lost in the crop-growing season by the use of horses in making trips to town for needed supplies, for such trips usually take three or four hours or more. The auto truck could be used to good advantage for these trips.

The truck ranges in capacity from half a ton to six tons, is as easily operated as an automobile, and the limit of its speed is governed only by the road over which it travels, the maximum being 20 miles an hour.

Truck Saves Labor

On the carefully laid out farmstead, the auto truck is capable of a great saving of labor in the handling of produce from the field to the granary or haymow, and in any other work that would suggest itself, as well as in the hauling of such produce to market.

The size and type of farm, the distance from market, and the condition of roads will determine the value of a motor truck to a farmer, believes E. V. Collins, instructor in steam and gas engineering.

"The truck is certain to become more popular as farm labor becomes more scarce and horse feed higher priced," said Mr. Collins. "It has proved almost indispensable to those farmers who specialize—dairymen, breeders, fruit growers, seedsmen, nurserymen, and truck gardeners. It may be used for hauling mill-feeds and breeding-stock as well as for marketing."

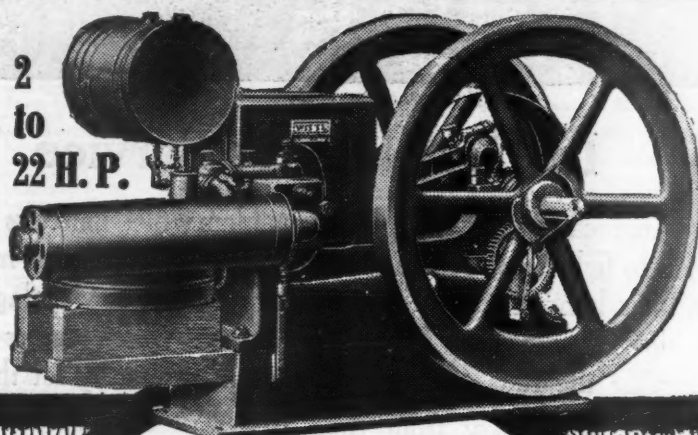
"The truck with a capacity of one or one and one-half tons seems to be the most popular, and it is better adapted to the wide range of uses on the farm. The truck has numberless advantages over horses. It saves time, is cheaper—providing there is enough work to do—and it stands without hitching. It is useful in taking men to and from distant fields in haying or harvest time, in hauling building material, and in fence building."

THE SELF-OILING WINDMILL

has become so popular in its first three years that thousands have been called for to replace, on their old towers, other makes of mills, and to replace, at small cost, the gearing of the earlier Aermotors, making them self-oiling. Its enclosed motor keeps in the oil and keeps out dust and rain. The Splash Oiling System constantly floods every bearing with oil preventing wear and enabling the mill to pump in the lightest breeze. The oil supply is renewed once a year. Double Gears are used, each carrying half the load. We make Gasoline Engines, Pumps, Tanks, Water Supply Goods and Steel Frame Saws. Write AERMOTOR CO., 2500 Twelfth St., Chicago



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emblem which unites us in war for human liberty and national honor. The service flag is the emblem which unites us in mutual sympathy for the men who give themselves and for those who give their men.

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First in the Field with a Successful Spray Pump

Tree Holes or Tree Beds?

Most farmers and orchard planters are prone to use the term "tree holes" when speaking or thinking of the blasting of ground for trees. In this they are wrong. The blasting of a tree hole is a crime against good practice. What should be done is to blast the soil where the tree is to stand and 'round about that spot for many feet, in order to prepare it for root penetration and expansion, and for feeding the tree better than it otherwise could. Incidentally, the loosening effect of the blasting makes the actual excavating of the hole for the planting of the tree easier and quicker. It can be done in a properly blasted bed with a shovel alone, and in less than a minute.

How to Blast

The charge of farm powder should be placed at a depth in the ground to be determined only on examination of the soil. If there are no layers of plow-sole, hardpan or clay—just clear loam to a depth of six feet or more—the charges may well be placed about three and one-half feet deep. But if there are layers of clay, hardpan or cemented gravel, the charges should be placed in them in order to break them thoroughly, whether this requires a depth of two feet or six feet. Watch for changes in the soil formation as you move across the field.

Having determined the depth for the holes, you then, and not till then, are ready to determine proper amount of powder for each charge. Invariably this should be just enough to lift and heave the ground to the surface, without blowing out a crater. Varying depths, of course, requires varying amounts. The proper charge will throw a little dust into the air, but actual earth will fly no higher than a couple of feet, and there will be little of that. The effect is confined beneath the surface.

Blast In Dry Soil

A factor that has a bearing on this matter is the comparative dryness of the ground at the time of blasting. In wet ground a blast will not break far. In fact, its action is to drive the soggy or plastic earth surrounding the charge away for a foot or so, leaving an open cavity underground where the charge was, surrounded or enclosed by hard, tight walls—just like a thick-walled jug or big pot. In dry ground there is no such result. The gases crumble the earth from the very beginning, and tend to lift masses of it from the depth at which the charge is placed. The earth, having no cohesion or plasticity when dry, breaks and splits apart in every direction. The result is that you have a bed of soil as deep almost as the charge was placed, ten feet or more in diameter, all of it loose, fine and full of air.

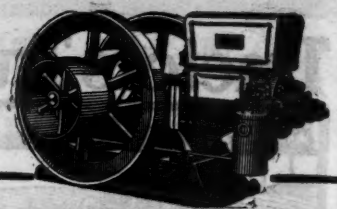
The test of condition for blastings is to take samples of the soil in your hand. Get the samples not on the surface, but down near where the charge is to go. Squeeze them. If they are dry enough they will crumble and break to dust under the pressure, and will run between your fingers; if too damp, the sample will lump and mold to your hand. Don't attempt the use of high percentage nitro-glycerin dynamite or powder for this purpose.

A VALUABLE BULLETIN

"The Propagation and Pruning of Plants" is the title of a document recently issued by the States Relations Service, United States Department of Agriculture, with the object of helping teachers in the secondary schools to present the subjects in an interesting and effective way to their pupils. The document, which is prepared by Mr. H. P. Barrows, specialist in agricultural education, outlines class-room instruction in both subjects, and suggests practical projects and discussions, and gives a complete outline of a demonstration project in this connection, for the renovation of an old orchard. The section on pruning covers principles, the pruning of fruit trees, small fruits, ornamentals, and shade trees, and gives some attention to practical tree surgery. It suggests a number of Farmers' Bulletins, which teachers will find helpful in presenting the subjects.

A CHICK RAISER

"And how are the twins today, Mrs. Hennessey?" inquired the kindly old gentleman peering into a howling perambulator. "I'm fair frazzled out," responded the weary mother. "They won't set, nor they won't lay. They jest squawks."



OTTAWA ENGINES

Kerosene Oil, Gasoline and Gas

Let me send you an engine to earn its own cost while you use it—for my Kerosene engine gives more power from a gallon of 6-cent kerosene than you can get from a gallon of 20 or 25-cent gasoline in a gasoline engine—Easy to start; easy to operate; no cranking; no batteries. All sizes—2 H.P. to 22 H.P.—Stationary, Portable and Saving Outfits. 10-Year Guarantee on Every Engine. Write for Latest Prices.

Direct From My Big Factory

Ever since I started my factory, years ago, I have been selling engines direct from the factory to the man in the shop or on the farm. Now, as before, any honest man can have my engine on

90 DAYS' TRIAL

Every engine I send out must make good all I guarantee. No need to pay double my price for any good engine, or take an out-of-date engine for any kind of a price. Let me show you how to figure what an engine is worth and

How To Know Better Engines

My newest book helps you choose a safe and value-received engine—How to make simple tests—and all about valve in head motor. Send me your address today. Just a postal card will bring this newest and latest book.

Geo. E. Long, OTTAWA MFG. CO.
1174 King Street, Ottawa, Kansas.

Light Weight

Cushman Engines

Built light, built right—for farmers who want an engine to do many jobs in many places, instead of one job in one place. Easy to move around. Very steady and quiet—no jumping, no loud or violent explosions, but smooth running. Throttle Governor, Schebler Carburetor, Friction clutch pulley. Runs at any speed.

4 H. P. Weighs Only 190 lbs.

Mounted on light truck, it may be pulled around by hand.

Just the engine for power sprayers because of light weight and very steady speed, giving uniform distribution and a thorough job. 8 h. p. 2-cylinder, for heavier work, weighs only 250 lbs. Book on Light Weight Engines sent free.

CUSHMAN MOTOR WORKS
955 N. 21st St., Lincoln, Neb.

For All Farm Work
4 to 20 H.P.

RAISE A BIGGER, BETTER GARDEN WITH LESS WORK

BARKER Weeder, Mulcher and Cultivator, 3 garden tools in 1, cuts weeds underground and breaks the surface crust in a porous, moisture-retaining mulch, in one operation. Intensive cultivation. "Best Weed Killer Ever Used." A boy or girl can operate it and do more and better work than ten men with hoes. Gets close to plants. Guards protect leaves. Has easily attached shovels for deeper cultivation. Makes gardening easier, quicker, surer. Send today for FREE Illustrated Catalog and Factory-to-User Offer.

BARKER MFG. CO.
David City, Neb.



IRON AGE

Farm, Garden and Orchard Tools

Answer the farmers' big questions. How can I grow crops with less expense? How can I save in planting potatoes? How make high priced seed go farthest? The

IRON AGE Potato Planter

solves the labor problem and makes the best use of high priced seed. Means \$5 to \$50 extra profit per acre. Every seed piece in its place and only one. Saves 1 to 2 bushels seed per acre. Uniform depth; even spacing. We make a full line of potato machinery. Send for booklet today.

No Misses
No Doubles

Bateman Mfg Co., Box 16B, Greer, N.J.

SILK WONDERFUL BARGAINS 4-Pound bundles of beautiful Silk Remnants for fancy work, quilts, portieres, pillows, etc. SEND 10c for big package of large lovely pieces. Agents wanted to sell silk, velvet and other remnants. Union S. Works, 251 Factory St., Boonville, N.Y.

Poultry for Profit



The Fruit Grower's Incubator

By C. A. Langston, Editor of "Poultry for Profit" Department

THE modern incubator is a substitute for the hen and, in some respects, is more reliable than the hen. If fifty or more pullets for fall and winter laying are wanted, an incubator will be necessary. Do not be afraid to trust any of the reliable makes. Here are a few suggestions from one who does all of his hatching for fall and winter layers with an incubator:

1. Do not fool with an incubator that has a capacity of less than 100 eggs. The smaller sizes are for those who are engaged in special breeding.
2. Provide hovering capacity equal to egg capacity of the incubator. By doing this you will save the chicks. Crowding is the beginning of trouble.
3. Regulate heat to the temperature called for by book of instructions, before the hatch is started. If temperature is not steady on the day selected, wait until the next.
4. From the twelfth day the temperature will commence to run high, and it will probably take a jump up on the eighteenth day, and tend to go still higher at pipping. Just watch these points and turn the adjustment screw as required. Otherwise, try to sleep soundly. You will probably forget to do your part by the hatch more often than the incubator, such as turning eggs, filling and cleaning the lamp.

The Price of Eggs

Readers of this department will recall the prediction made last fall that eggs would bring 50 cents at country stores before the close of winter. The price actually went to 68 cents. Producers are amazed. And those who have no eggs to sell are full of self-reproaches.

Some reasons for the egg shortage are, in the first place, that many hens and pullets have been sent to market and many more have been served on farm tables. Mr. Hoover specially urged the substitution of poultry for beef and pork. In consequence the poultry stock of the country has been greatly reduced. As this process of reduction has been going on for more than a year the egg production last season did not meet the normal demand for immediate consumption and storage. One cold storage plant reports only 500 cases on hand the first of January, whereas more than fourteen thousand cases were on hand on the first of the previous January.

In the second place, the high cost of feed coupled with winter weather of record severity, has cut down the winter production of the early pullets and postponed the production of the molting hens. There are millions of pullets and hens which are idle right now because they do not get enough feed to keep up the body-life and make eggs. They have been deluged with corn, and in consequence have laid on internal fat to the detriment of egg production.

A Better Ration

Why farmers will keep on doing this year after year is a great mystery. Corn is worth \$3.30 per hundred and mill feed \$2.25. By feeding a wheat by-product the corn consumption would be cut in half, and at the same time the hens would be getting substances essential to the composition of an egg but which are not present in corn to the same extent. For every 200 pounds of corn and mill feed there would be a saving of \$1.00 in the feed bill as compared with the use of corn alone.

A little beef scrap mixed in the mill feed, and the mixture put in a hopper where the chickens can help themselves, would soon bring the corn-fed farm flocks around to fair egg production.

The farmer who complains that this combination will cost too much should figure the cost of any ration that falls short of egg production. The costliest feed is

the eggless feed, and the pure corn ration is an eggless feed.

Government Steps Forward

Every post office in the land is now displaying a poster on poultry husbandry. One bright man read the section which begins with the stately word "eliminate" and purports to deal with the subject of removing roosters from the flocks by June first in order to produce infertile eggs during the summer months, and remarked that the first reading gave him the impression that it was the roosters that produced the infertile eggs.

Another section treats of poultry-house construction. Nail strips over the cracks in the walls of the old hen house, it advises. A literal interpretation of the advice would mean in many cases airtight hen houses, and consequent frozen combs and feet. The simple rule for all building and alteration for poultry purposes is to make the building absolutely wind-proof on three sides. The fourth side, preferably the southern, should be open. A wind-proof shed of this description would be safer than a building with open windows inserted without reference to the laws governing air drafts. Farmers had better let open-window designs alone if they are uncertain as to the proper arrangement and location. Get the state model and build right, or knock out the south side and let it go at that.

Best Hatching Dates

This same poster offers some advice on this subject: "For the heavy breeds—Rocks, Wyandottes, Reds—aim to get off the first hatches by March 1." This date will give the pullets time to reach laying maturity by September first. If winter-laying pullets are wanted, this recommendation will not apply to many poultry keepers. For a wide southern belt of the country pullets, in laying by the first of September, would mean pullets in molt by the first of December. It is a fact that the winter-egg production can be defeated as effectively by hatching too early as by hatching too late. This is particularly true of those sections in which cold weather does not normally appear before the middle of November. There is no single date for the early hatches for winter layers that holds good for all parts of the country. For the southern belt, extending as far north as the Ohio river, April 1 is nearer the right date.

Feeding has something to do with the development of winter-laying pullets. Their growth must not be forced or retarded. Just give them plenty of range and two feeds daily of a grain mixture, after they are four months old. And put them in their laying quarters one month before they are expected to commence laying.

Try to find a good breeder and do not begrudge him a fair price for select eggs from select stock. Two dollars a setting of fifteen eggs is not a high price in these days. If laying stock is wanted, be careful about buying into the show strains. And remember that a large express bill does not necessarily impart virtue to the eggs in the express package. A neighbor may have just as good stock as you will get by buying one thousand miles from home.

HOW TO SAVE BABY CHICKS

Firman L. Carswell, 632 Gateway Station, Kansas City, Mo., a prominent poultry raiser and owner of Rockledge Farm has issued a remarkable book on poultry. Baby chicks and how to handle them in order to save a full hatch is one part of this book that will save and make many dollars for every poultry raiser. Much valuable information is also given on simple remedies that can be applied at home to rid poultry of lice, gapes, etc. This book will be sent free to any one writing for it to Mr. Carswell at above address.

Biggest Hatches Strongest Chicks

That's what you will get with my Hatching Outfit—and I can prove it. The whole story is in my big catalog, "Hatching Facts", sent Free. It tells how money is made raising poultry. Get this Book and you'll want to start one of my Guaranteed Hatching Outfits making money for you. It's good patriotism and good business to raise poultry this year, and



'895 140-Egg Buys Champion Belle City Incubator

Prize Winning Model—Double Fibre Board Case, Hot-Water, Copper Tank, Nursery, Self-Regulated Safety Lamp, Thermometer, Holder, Egg Tester, With \$5.25 Hot-Water, Double-Walled, 140-Chick Brooder, both only \$12.95

Freight Prepaid

East of Rockies—allowed towards Express and to points beyond—I ship quick from Buffalo, Minneapolis, Kansas City or Racine. Used by Uncle Sam and Agr. Colleges. With this Guaranteed Hatching Outfit and my Guide Book for setting up and operating you can make a big income. And my

Special Offers Provide Wagon for You to Make Extra Money Save time—Order Now, or write today for my Free Catalog, "Hatching Facts"—It tells all. Jim Roban, Free. Belle City Incubator Co., Box 103 Racine, Wis.

5 Poultry Books Free

"LEE'S POULTRY BOOK" "CARE OF BABY CHICKS" "ALL ABOUT EGGS" "SECRETS OF SUCCESS WITH CHICKENS" "POINTERS FOR SUMMER AND FALL" This Lee Poultry Library of five booklets for 5c stamps to cover mailing. Send at once to GEO. H. LEE CO., 424 Lee Building, Omaha, Nebraska

DAY-OLD CHICKS

of quality guaranteed to 1,500 miles. Eggs for Hatching at low prices. Bar Rocks, S. C. W. Leghorns, S. C. and R. C. Reds, W. Wyandottes, Buff and W. Orpingtons. Chicklet catalog free. GOSHEN POULTRY FARMS, R 4 Goshen, Indiana

Save All Your Chicks

E. J. Reefer, the poultry expert, 245 Reefer Bldg., Kansas City, Mo., is giving away free a valuable book entitled, "White Diarrhoea and How to Cure it." This book contains scientific facts on white diarrhoea and tells how to prepare a simple home solution that cures this terrible disease over night and actually raises 98 per cent of every hatch. All poultry raisers should certainly write Mr. Reefer for one of these valuable FREE books.

POULTRY AND PIGEONS FOR PROFIT

For a big book tells all about it. Contains many colored plates—an encyclopedia of poultry information, poultry houses, feeding for eggs, etc. WRITTEN BY A MAN WHO KNOWS. Sent for 5 cents. Low price, fowls and eggs. FRANK FOY, Box 6, CLINTON, IOWA

PARKER'S HAIR BALSAM

A toilet preparation of merit. Helps to eradicate dandruff. For Restoring Color and Beauty to Gray and Faded Hair. 50c. and \$1.00 at drugists.

WILL SAVE YOUR CHICKS

Any reader of this paper who will write P. J. Kelly, the Poultryman, at 66 N. 2nd St., Minneapolis, Minn., will receive a Free Copy of his new booklet, "White Diarrhoea in Baby Chicks." It tells how to prevent, remedy and save the whole hatch. It's free, and this paper urges you to write for it at once.

IRONCLAD

TRADE MARK

150-EGG Incubator

Don't class this big galvanized iron covered, dependable hatcher with cheaply constructed machines. Ironclads are not covered with cheap, thin metal and painted like some do to cover up poor quality of material. Ironclads are shipped in the natural color—you can see exactly what you are getting. Don't buy any incubator until you know what it is made of. Note these Ironclad specifications: Genuine California Redwood, triple walls, asbestos lining, galvanized iron covering. Large egg tray, extra deep chick nursery, hot water top heat, COPPER tanks and boiler, self-regulator, 17500 Thermometer, glass in door, and many special advantages fully explained in free catalog. Write for it TODAY or order direct from this advertisement.

IRONCLAD INCUBATOR COMPANY, Box 35 RACINE, WIS.

Both for \$12.50 Freight Paid East of Rockies

150 Chick Brooder

MADE OF CALIFORNIA REDWOOD

150 Chick Brooder

MADE OF CALIFORNIA REDWOOD

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150 Chick Brooder

MADE OF CALIFORNIA REDWOOD

Stop Hatching Weak Chicks

With Cheap Incubators

Remember it is not how many you hatch that counts, but how many you raise. Chicks that hatch out weak and wobbly, and live but a few days, mean nothing to you except trouble and loss.



Queen Incubators

Hatch Chicks that Live and Grow

Built of genuine redwood—with double walls all around. Redwood does not absorb the odor from the hatching chicks. Cheaper woods, and pasteboard lining in iron and tin machines, retain the odors, to weaken and kill the hatching chicks. A Queen costs but little more, and the extra chicks that hatch and live soon pay the difference. CATALOG FREE. QUEEN INCUBATOR CO., Lincoln, Nebraska

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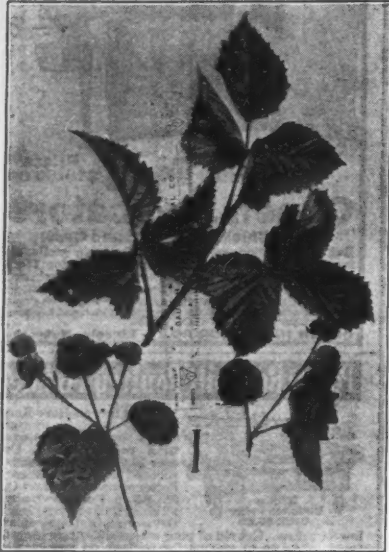
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Queen Incubators

Project to Improve Berries

By Wellington Brink,
College Station, Texas.

A project that has been carried on by the division of horticulture, Texas Agricultural Experiment Station, under the Adams fund of the federal appropriation for several years, is the improvement of rasp-



No. I—Fertile Plant Selected From Second Generation for Further Propagation Resulted From Cross Between the Well-known Brilliant Raspberry and the Louisiana Dewberry (*Rubus rubisetus*).

berries and blackberries, or the hybrids between them.

H. Ness, horticulturist in charge, has the following to say in regard to his experiment:

"It is a well-known fact that the crossing of plants gives, as a general thing, rise to a variable progeny, in which the stability of characters is so shattered that all combinations of the parent characters, and even



No. II—Sterile Plant of Second Generation.

some that seem entirely foreign to either parent, may occur. It is for this very reason that our modern improvement of plants so frequently makes its start with crossing, or hybridization.

"In spite of the apparent advantages of obtaining a new combination of desirable characters in a great variety of forms, this



No. III—Representative of First Generation. Variably Sterile. Parent of Nos. I and II.
No. IV—Louisiana Dewberry Obtained From Seed Collected in Southern Louisiana. Mother of No. III and Grandparent of Nos. I and II.

method has its drawbacks. The most common of these is sterility on the part of the very first product of the cross, as in the case of the mule among animals. Sterility, to a degree more or less insurmountable, has delayed this work of improving raspberries and blackberries. Yet, since this

sterility was not absolute, as in the mule, but variable in a degree, the work has been continued.

Hybrids Produced This Year

"This year for the first time fertile hybrids were produced, when 280 plants, a second generation of hybrids between the Brilliant, a red raspberry, as father, and a native blackberry, as mother, gave five perfectly fertile individuals. These five plants were very similar in all characters, being typical raspberries in stems and leaves, and intermediate in the characters of the flow-

er and fruit. This fruit was dark red or brown, larger than that of the raspberry. It more closely resembled in form that of the raspberry than that of the blackberry, being spherical in outline. The fruit takes its aroma from the raspberry, while the flavor is a pleasant mild acid, partaking of the qualities of both raspberry and blackberry.

"It is hoped that the seeds from the fruits of these plants, sown in September, will bring forth a large third generation, from which ample opportunities for further selection for economic excellences may be had."

YOU COOK YOUR FOOD—WHY NOT YOUR TOBACCO?

YOU know what broiling does to steak, baking to a potato—and toasting to bread.

In each case flavor is brought out by cooking—by "toasting."

So you can imagine how toasting improves the flavor of the Burley tobacco used in the Lucky Strike Cigarette.

IT'S TOASTED



If your dealer does not carry them, send \$1.20 for a carton of 12 packages to The American Tobacco Co., N.Y. City

© Guaranteed by
The American Tobacco Co.
INCORPORATED

When you say "Phew! it's cold," don't forget that your stock, if gifted like Balaam's ass, would say the same thing. Do all you can to make the faithful creatures comfortable. Give them the best shelter possible and stoke their inside furnace with hearty feed. Do this because you are a decent sort of fellow and know that "a merciful man is merciful to his beasts," but at the same time you might as well realize that what you spend now to make them comfortable is the truest economy and will be repaid to you in better capacity on their part.

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Livestock and Dairy



Several Items of Interest

Official World's Record Cow

A new goal for official milk production has been reached by a Holstein-Friesian cow in British Columbia. Her record just completed is 30,427 pounds of milk with a butter production of 1,072 pounds. From the time of her first freshening to the end of her present 365 days' test she produced 110,149 pounds of milk. She is under eight years of age.

Dairy Cows for the South

The Great War is causing many shifts. The Weekly News Letter of the U. S. Department of Agriculture says: "To have cows as a part of the equipment on every farm, enabling the tenants to become self-supporting throughout the year and at the same time maintain desirable soil conditions, is a plan recommended by the Bureau of Animal Industry among the land owners of the south. The plan is accompanied with an active campaign for feed production; as a result, marked increase in the acreage of legumes, particularly velvet beans and peanuts, has been shown."

No Substitute for Butter

The Attorney General of Wisconsin has recently handed down a decision that oleomargarine may not be substituted for butter on the table of the State Veterans' Home. In this connection it is stated that about one year ago a similar substitution was made in a state institution farther east, but after a period of trial it was found that the total saving was more than offset by the cost of increased medical attention. The conclusion is that the money saved in substituting oleomargarine for butter soon finds its way into a doctor's pocket.

How Milk Is Used

According to experts of the U. S. Dairy Department, the 1917 milk production of our country is 89,547,500,000 pounds of milk, from 22,768,000 cows—4,000 pounds of milk per cow. We use that milk in these ways: 39,600,000,000 for butter making, yielding 1,650,000,000 pounds of butter; 36,500,000,000 for drinking; 4,200,000,000 for cheese, making 420,000,000 pounds of cheese; 3,150,000,000 for ice cream, making 210,000,000 gallons of ice cream; 2,437,500,000 for condensed milk, making 975,000,000 pounds of condensed milk.

Eat More Cottage Cheese

The by-product of butter making is 32,679,000,000 pounds of skim milk which could be made into 4,901,000,000 pounds of cottage cheese. And that much cottage cheese would contain more protein than is contained in all the beef consumed in the United States.

This will suggest the opportunity for food conservation in the utilization of skim milk, in the form of cottage cheese for human food, instead of feeding it to stock or throwing it away.

Hog Killing in Britain

According to official figures secured by the United States Food Administration, hogs have decreased much more than any other class of livestock in the British Isles. The total decline for 1916 and 1917 was over 600,000, of which more than 50,000 were brood sows.

CO-OPERATIVE ORGANIZATIONS

A survey of co-operative and marketing enterprises by the Office of Markets and Rural Organizations is reported by the U. S. Department of Agriculture in "Co-operative Marketing Organizations Among Farmers in the United States," Bulletin 547, Washington, D. C.

There are about 12,000 of these organizations. Minnesota takes the lead, followed by Iowa, Wisconsin and North Dakota. Elevators, live stock shipping

associations, creameries and cheese factories are the principal fields for co-operation in these states. Then comes the Pacific Northwest with its fruit and produce associations. Cotton organizes the farmers in the southern states and tobacco in Kentucky. Creameries lead in this line of endeavor in New England.

State laws relating to the formation of co-operative associations are given, together with much valuable knowledge concerning the financing and business practices of various types of organization.

The sugar shortage has caused much thought to be taken as to how we may overcome this difficulty and so far the best suggestion seems to be the general one of raising more bees and getting more honey. It is said that honey can be used in most recipes where sugar is called for, and it is claimed that the care of bees is less work than any other chore connected with the farm.

WORLD'S BEST BY ACTUAL TEST

In the Official Skimming Tests made by Jury of Dairy Experts at the World's Fair Exposition, the "IOWA" CREAM SEPARATOR outskimmed all competing separators. These Official tests and other skimming tests made by leading Agricultural Colleges, prove that the "IOWA" Cream Separator skims closest. The "IOWA" is the only separator with the famous, patented **CURVED DISC BOWL**.

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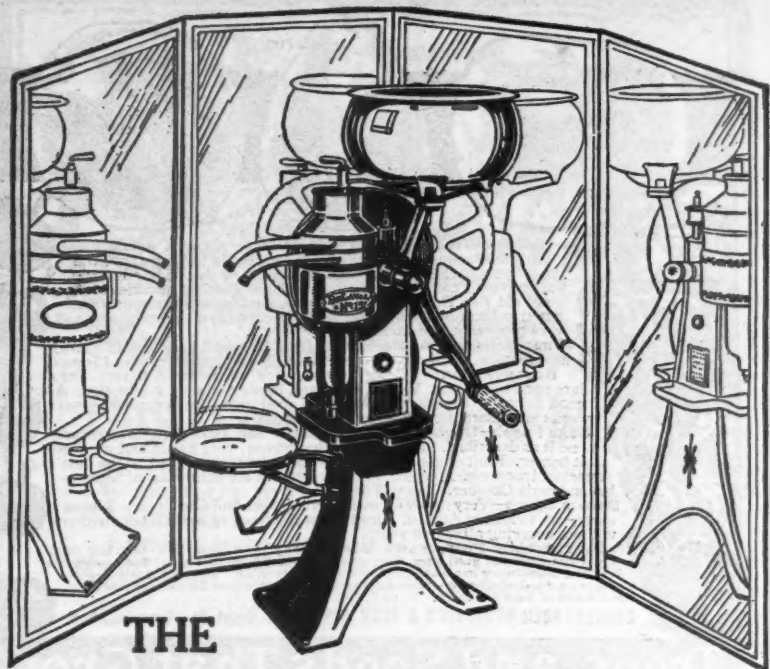
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And neither can you.

Order your De Laval now and let it begin saving cream for you right away. Remember that a De Laval may be bought for cash or on such liberal terms as to save its own cost. See the local De Laval agent, or if you don't know him, write to the nearest De Laval office as below.

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Everbearing Progressive Strawberry—a new fall-bearing one. Fruit smooth and of good color. Very strong plants \$2.00 per 100. Soudereger's Earliest Blackberry has more good points than any other. Soudereger's Tomato—a wonderful bearer—two weeks earlier than any other. Full size packet 25c. Free Book of trees and seeds. Write for it.

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Fruit Growers Were Saved \$100,000.00

In the August fifteenth issue of THE FRUIT GROWER, a NEW SYSTEM of applying liquid spray was first announced. A FASTER—EASIER method, made possible by a new invention called "Spray Gun." It was found that with this gun, one man could distribute spray much faster than two men with long poles and do much better work—owing to the extreme projectiveness of the fine spray—made possible by the invention which by a peculiar air draft, the finest spray was carried into the tops of the tallest trees.

Practical growers from all parts of the country visited the factory and made very careful tests of the apparatus and found that it was surprisingly efficient. As a result—more than one hundred of a NEW TYPE, 10 H. P., twenty-gallon-per-minute power sprayers were sold and thousands of the sprayguns. The first announcement of this new system had for its caption:

Spraying Revolutionized

When reports began pouring in that these powerful sprayers were putting out 4,800 gallons per day and that the thousands of sprayguns were not only saving one-half the labor but—doing much better work with 25 per cent less spray material—then this new system and the spraygun, as they were called, were proven to be the most practical and economical method for the distribution of liquid spray and the extremely conservative figures have been placed on last year's saving to the fruit grown by the use of the gun in labor and material of ONE HUNDRED THOUSAND DOLLARS.

Owing to the varied conditions in all parts of the country, it was decided to build these powerful sprayers in ONE TYPE but in THREE SIZES and they are truly wonderful machines.

The GUNS are so constructed that a suitable disc can be used to accommodate the capacity of any power sprayer capable of developing 200 lbs. pressure. Thousands of these guns were used on all kinds of power sprayers last year. Investigation shows that the very best fruit grown last year was sprayed with these guns; fruit that sold at the highest market price.

A matter of no little importance is—WHO IS RESPONSIBLE FOR THESE ACHIEVEMENTS? At the New York State Fruit Growers' Convention held at Rochester, just a few days ago, these three unique sprayers with the spraygun, were on exhibition. Beautiful apples from different sections were also shown as evidence of the effectiveness of this method of spray. It was, as might be expected, "FRIEND" MANUFACTURING COMPANY, GASPORT, NEW YORK, was the proud and happy possessor of all the honors in connection with this new system and the spraygun which is fully covered by patents owned by THE "FRIEND" COMPANY.

Most of the practical sprayer features in use today that have real merit were invented by these people who seem to have special ability along this line. It was this same company who built the first power sprayer ever made and the grower who has not had the opportunity to operate the equipment made by these "friends of the fruit grower" at Gasport, certainly have not found the true pleasure of true spraying.

The distribution of these sprayers and the sprayguns is made throughout the west by the United Rex Spray Companies with headquarters at Toledo, O., Omaha, Neb., North Yakima, Wash., and Benicia, Cal.

Many attempts will be made to copy the "Friend" Company's inventions but the majority of growers will prefer to co-operate with those who are spending thousands of dollars in order to make the hardest job on the farm a REAL PLEASURE.



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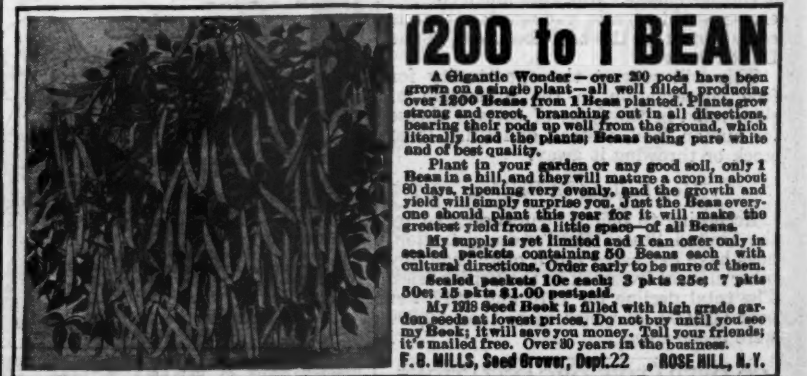
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Apple Cankers and Control

By A. S. Colby, Editor "Diseases of Fruit and Tree" Department

THE word "canker" is loosely used in connection with a diseased condition found on woody plants where bark is killed over a more or less definite area.

The causes of cankers are many and varied and include the following: (1) those primarily brought on by unfavorable weather conditions, such as frost injury; (2) those caused by mechanical injuries, such as are induced by tillage implements carelessly used, and (3) cankers directly attributed to the entrance of fungi or bacteria into the plant tissue where the bark has not been bruised.

By far the greater number of cankers are started by an injury to the bark of the tree exposing the unprotected tissue to fungus attack, whereupon spores of the various bark and wood destroying fungi come to rest there and start growth if sufficient moisture be present. The growth and spread of the disease irritates the surrounding tissue to such an extent that the latter is killed, making it impossible for the tree to heal over the wound.

Apple Cankers Serious

The cankers on apple trees are more serious than generally supposed, since once established they usually persist from year to year, gradually enlarging till the limb, and in time the whole tree, is killed. In addition, the fungus or bacterial disease



Black Rot Canker

present in the cankered area sends out annually, usually in the spring, immense numbers of spores or propagating bodies which spread the disease.

One of the most important apple cankers is that known as the black rot canker, or, as it is generally known in the eastern part of the United States, the New York apple tree canker. This disease is especially dangerous, since it not only lives on the limbs, but has other forms, as spots on the leaves, and as a rot on the fruit itself, all being present on the same tree. Neither is it confined to the apple, but is also found on other fruit, shade, and forest trees.

The distribution of the above disease in apple orchards is general throughout the apple growing sections of the United States which extend from the Mississippi river to the Atlantic coast, and is also quite common in southeastern Canada. In some sections it seems to be more prominent in one form than another, which is the reason for its generally accepted name of the New York apple tree canker in that section.

When Canker Begins

The canker on the limb commences as a small, reddish brown area, usually on the upper surface of the limb, originating in a wound of some sort, such as that left by a twig being broken off. As the diseased area increases in size, it darkens, and soon the bark becomes rough and cracked, being killed back to the wood. The sap wood is attacked in turn. With continued growth of the fungus in the bark, more cracks are formed parallel with the long axis of the branch until the entire limb is girdled, resulting in its ultimate death. When the sap wood is affected, it is evidenced by the dark brown stain given it. The bark clings to the wood for some months or years, but before breaking away, large numbers of the small, dark colored pustules or fruiting organs appear over its surface. From these pustules or spore cases

appear multitudes of spores in the spring of the year, continuing some weeks. These fruiting pustules are shown near top of cankered area in accompanying picture.

As the spores are borne in the cankered areas, they are washed down by the spring rains to the unfolding leaves, and later to the growing fruit. On the leaves the spores germinate and enter the tender leaf tissue, seemingly without a wound being necessary. In a few days, small, purplish specks appear, enlarging till they reach in some cases, the size of $\frac{1}{8}$ inch in diameter, and turning to a yellowish brown, with a center more of a grayish color. The spot is irregular in outline, which, with the peculiar color shadings present has suggested the name "frog-eye" for the appearance on the leaf. Bordeaux injury on the leaf is sometimes confused with this form of black rot, especially in the early part of the season, but is easily identified by the fact that spray-injury spots remain small and circular throughout the summer.

It is not thought that spores arise from the leaves to any extent, though characteristic fruiting pustules have been reported as being present on the leaves.

Black Rot

Black rot on the fruit is characteristic in that the apple is reduced to a black mummy, covered thickly with the pustules as described for other forms of the disease. These mummied fruits, hanging on the tree over winter, may also aid in spore dissemination at the beginning of the growing season. The disease may start at the blossom end of the apple, or at some wound, the author having in many cases traced its entrance to the hole made by the codling moth in the side of the fruit. As the fruit becomes ripe, it is more subject to attack than in the green state. Spores are soon developed and disseminated from the numerous pustules on the apple all through the summer. As cold weather approaches fungus activity ceases, the cankers being the chief source of infection at the beginning of the next growing season.

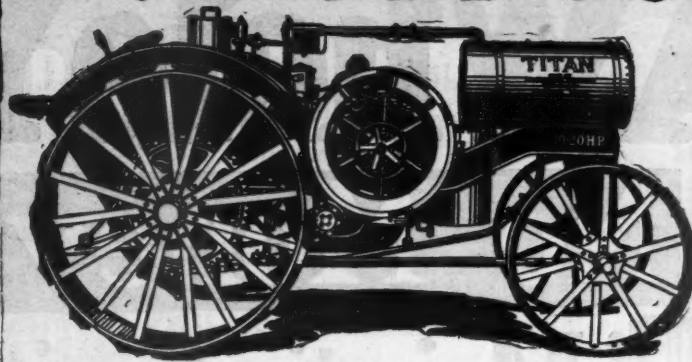
Remedies to Adopt

From a study of the above characteristics of the black rot, it becomes evident that there are two methods of attack available for the orchardist in controlling this disease. (1) the removal of the cankers and mummied fruits as sources of infection, and (2) the protecting of the susceptible parts of the tree by proper sprays.

In the removal of the sources of infection, the badly cankered limbs should be cut off during the winter season at the time for regular pruning. If systematic care is taken of the orchard, the canker will never get a foothold. The author has seen many a New England orchard, however, where the trees were not worth working with because the canker had nearly girdled the scaffold branches, and it was only a question of a few years before the entire tree would be dead. In pruning, the branch should be cut close to and parallel with the parent branch of the trunk. Never leave a stub. The cambium layer will start to roll over the wound, and if the tree is vigorous will soon seal the wound from outside infection.

Various coverings are in use designed to protect the open wound from the fungus infection till the cambium layer has grown over it. None of these is absolutely satisfactory. The author, however, has used a paint of raw linseed oil, thickened with white lead and darkened with lamp black with fair results. No covering can fail to injure the cambium to some extent, but little harm is done if painting is deferred till the cambium roll has started to grow around the wound. If the pruning is done just before growth starts, painting may be done a few weeks later.

The protection afforded the leaves and fruits by spraying is especially important, since spores are continually starting new disease centers thereon throughout the growing season. By the regular spray schedule outlined for ordinary summer spraying, the disease can be quite effectually checked. This included the "pre bloom" spray, the "calyx" spray, and two more, one at approximately three weeks after the bloom, and the other at approximately ten weeks after the bloom. The first three sprays may be lime sulphur, while the last should be bordeaux.



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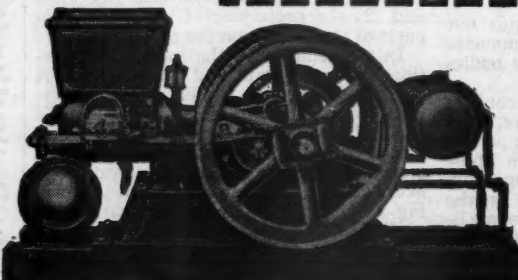
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W-Barret Hankins Says - A Housewife Should Fill Her Position As Executive.

THE Cleveland Press said editorially: "The test of civilization is the estimate of woman."

"Her power and influence lie in her effeminacy. It is her gentleness that raises men to her level of goodness and restrains them from their own baseness."

"Angels are likened to her that they may seem fair. She has in her all that men can think of Heaven."

"Every true woman is a queen by right of virtue and every man a slave to one by force of all good that God put in him."

"Staunch to right, faithful to her duty, true to herself, she is the cleanest work of the Creator. Surely, nature intended woman to be her masterpiece."

There in simple language is woman beautifully and remarkably described.

The test of civilization is the estimate of woman—she raises men to the level of her own goodness.

A most wonderful dual position—on the one hand she is held down to the level of civilization, and on the other hand she lifts men to the level of herself. It would seem a condition too complicated to work out of—a task too gigantic to perform.

But look where woman stands today, "Angels are likened to her that they may seem fair. She has in her all that men can think of Heaven."

She stands executive over her own destiny, over the destiny of man and over the destiny of civilization.

She has exercised her executiveship by "her effeminacy and her gentleness."

Today the effeminacy and the gentleness of woman is needed more than the need has ever been felt in the history of the world.

How are we to have, to feel and to realize the benefits from these qualities, which can be likened only to the Divine.

By each woman assuming the role of executive over her own domain—not by grasping the reins of governing and driving roughshod over all things, but by taking the reins of destiny and with her effeminacy and gentleness guide us to that still higher civilization, the vision of which God set in the mind of woman at the beginning of the world.

Can she do this standing over the wash-tub?

Can she do this while working over a hot stove?

Can she do this with broom in hand and with aching back?

Can she do this working until late in the night and beginning early in the morning, to struggle with the drudging details she is confronted with daily?

She has done it and she has not murmured against it.

She is doing it and she is not murmuring against it.

She will do it and will not murmur against it.

But she should not have to.

Today there are means provided to put housework on a basis of efficiency that rob housework of its unnecessary labor.

Today we have mechanical means for cooking, washing, ironing, cleaning, canning, sewing, each in its respective field reducing labor 75%, reducing expense 50% and rendering 75% better results.

I asked you in the beginning of these talks to put your home on a business basis—keep a record of your hours of work. You have been doing this. You know how many hours you spend per day, per week, per month, washing, cooking, ironing, cleaning, canning, sewing.

You know that if you had these hours to plan for your family's future—to spend with your children, to give to the members of your household—to be, so-to-speak, absolutely selfish that your home, your family and yourself, should advance with all speed of progress possible, that these hours would be worth dollars of gold in valuation so great that neither you nor I or anyone could estimate them.

You could not have all these hours, but you could have a great part of them, by equipping your home with the mechanical means for doing the work you now do.

I want to ask you this month to install in your home just one efficient modern appliance for doing the work you now do yourself and for which you have kept record of the hours, and note the improvement. Keep record of the hours as usual and it will be a revelation to discover the hours saved. The greater achievement you are able to accomplish in those hours saved, will mark the day you started work as the more efficient executive of your home.

As an executive, it is a part of your duty to yourself and to your tasks, to ask yourself, "What did I do with the hours I had today?"

The hours you had today were dollars. Not dollars you could feel, and purchase with and bank today. But these hours properly utilized would mean the same as though you had reached down into your pocket and bought and paid for the future of your home:

In health.

In happiness.

In the future morals of your growing children.

In the future mental advancement of your growing children.

In the future financial standing of your home.

In your own future health, strength and mental development.

You say—my mother and my grandmother did not have the conveniences and comforts we have today, and look at us. We are a type of manhood and womanhood to be proud of.

You are right. But remember this—more will be demanded of the present and coming generations than is today demanded of you and I.

Bear this also in mind—as a whole we do not rise above our homes, but through the home, we are lifted and can be carried to whatever height of ambition rests within the spirit that prevails in the home.

I speak of the home as the nation and it is your home and my home and the million other homes of which yours and mine are typical that make a nation.

It should be your wish and mine that our homes do our part.

Big Poultry Profits

Prof. T. E. Quisenberry, President American School of Poultry Husbandry and former Director of the Missouri Poultry Experiment Station, has written a book founded on his many years of practical experience as a successful poultry expert. The name of this book is "Dollars and Sense in the Poultry Business." This book he will mail free to all who are interested in poultry raising. The need of the country for every ounce of food products and the high prices of poultry and eggs make this book especially valuable at the present time. Every egg should be hatched and every chick should be raised. Most poultry failures are the result of "Not Knowing How." This book from one who knows "tells How." It is mailed free on request. A postal card will bring it. Write today to Prof. T. E. Quisenberry, Pres. American School of Poultry Husbandry, Box 84-J, Leavenworth, Kansas.

Tells why chicks die

E. J. Reefer, the poultry expert, 345 Reefer Bldg., Kansas City, Mo., is giving away free a valuable book entitled, "White Diarrhoea and How to Cure It." This book contains scientific facts on white diarrhoea and tells how to prevent a simple home solution that cures this terrible disease over night and actually raises 99 per cent of every hatch. All poultry raisers should certainly write Mr. Reefer for one of these valuable FREE books.

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I want you to have the kind, 6 packets, Royal Asparagus, North Vermont, Mountain Peas, Marigolds, Pink and Cherry Flower, 10¢ 6 packets Vegetable Seeds, 10¢ 6 packets Plant, 10¢ 6 packets, Giant Peas and 10 seeds Sweet Peas, 10¢. Send today A. C. ANDERSON, Box 55, Columbus, Neb.

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The Food Controllers of United States and Canada are asking for greater food production. Scarcely 100,000,000 bushels of wheat can be sent to the allies overseas before the crop harvest. Upon the efforts of the United States and Canada rest the burden of supply.

Every Available Tillable Acre Must Contribute; Every Available Farmer and Farm Hand Must Assist.

Western Canada has an enormous acreage to be seeded, but man power is short and an appeal to the United States allies is for more men for seeding operations.

Canada's Wheat Production Last Year was 225,000,000 Bushels; the demand from Canada alone, for 1918, is 400,000,000 Bushels.

To secure this she must have assistance. She has the land but needs the men. The Government of the United States wants every man who can effectively help to do farm work this year. It wants the land in the United States developed first, of course; but it also wants to help Canada. Whenever we find a man we can spare to Canada's fields after ours are supplied, we want to direct him there. Apply to our Employment Service, and we will tell where you can best serve the combined interests.

Western Canada's help will be required not later than April 5th. Wages to competent help, \$50 a month and up, board and lodging.

Those who respond to this appeal will get a warm welcome, good wages, good board, and find comfortable homes. They will get a rate of one cent a mile from Canadian boundary points to destination and return.

For particulars as to routes and places where employment may be had, apply to

U. S. Employment Service, Dept. of Labor

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My Famous Split Hickory Buggies are known everywhere. They are the finest rigs on the road—over 250,000 in use. Made of the best material from top to tire, seat and practical designs. My FREE catalog shows over 150 different styles to select from—also an exceptionally fine line of harness. If you consider \$40 worth saving don't buy a buggy until you get my catalog. Send today.

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DAY OLD CHICKS FOR SALE. 10 Varieties, strong healthy chicks. Pure Bred and utility stock. Circular free. Old Homestead Hatchery, Dept. G., New Washington, Ohio.

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My ideal of happiness is a pleasant, convenient farm home, surrounded by grass and flowers and a large orchard of choice fruit. Our four acres of thrifty young apple, peach and cherry trees are already producing profitable crops; and what could be more pleasant than the great masses of fragrant flowers in the springtime, or the cool, inviting shade through all the long, hot days of summer, or the privilege of picking at any time just the variety or flavor of fruit one likes best?

When I was a child all the fruit we had grew on a dozen seedling apple trees, and few of the neighbors had a much better supply. Old folks said "there is no use of planting trees of late years; the worms and rabbits destroy them." And it seemed to them that the old orchards (planted perhaps seventy-five years before) were dying out awfully fast.

And even in these "late years" we have planted and cared for fruit trees of every kind, and they not only live, but produce bountifully. A few grape and raspberry vines, with a very little care, will produce enough fruit for a family; and they are so nice I just wonder why everyone who owns any land at all doesn't have them.

In the spring of 1916 I set 1,000 strawberry plants, mostly Warfield and Senator Dunlap. The soil was just ordinary, like the rest of our orchard land, and no commercial fertilizer or manure was applied. The summer was unusually wet and I had a hard time battling with the weeds and grass, which seemed so determined to smother all my visions of strawberries, sugar and cream. But I bravely kept up the struggle when the ground was dry, while my neighbors smiled and made comments.

Last spring I hoed the weeds out until the plants began to bloom. We had ripe berries by the middle of May, and every day following for a month we had all we could use. I gave every one of our neighbors a bucket of berries, canned 40 quarts and sold \$32 worth.

One hundred incubator chicks and a bunch of partridges had access to the patch, and soon discovered they had a "tooth" for strawberries. They did considerable damage, but we had "enough and to spare." I kept the patch cultivated this summer, and I expect a better yield next year if the season is good.

SOIL PHYSICS AND MANAGEMENT

By J. G. Mosier and A. F. Gustafson, Illinois

This book is unusual in that it is a scientific treatise upon soil physics, and is at the same time full of interest and practical usefulness for the ordinary farmer. The authors announce their purpose as threefold: "First, as a sort of text-book for agricultural students; second, as a reference book for the practical farmer; and third, as an aid to the landowner who desires information in the personal management of his land. "With the aid here given the average farmer can obtain results, as indicated on page 346, a difference of three or four times the average production." There are 202 illustrations of peculiar clearness and beauty, and of such general interest that they can be enjoyed by every member of the household, even those not directly concerned with the management of the soil.

Published by J. B. Lippincott Company, Philadelphia, Pa. Price, \$2.00.

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At a recent horticultural fair in California, a locomotive was composed throughout of apples. Every detail of the locomotive was accurately portrayed, and together with the track, cross-ties and rails was made entirely of apples. The locomotive was 27 feet long and nearly 10 feet high. During the exhibit the wheels were kept in constant motion.

A FRIGHTFUL TONIC

"Say, Bill! Is your Uncle Sam going to take a tonic this spring?"
Bill—"Wall, I 'low 'long about that time he'll be taking Teu-tonics."

How are we going to obey the mandate to "keep the home fires burning" and at the same time be patriotic and help ourselves to our daily allowance of coal with the sugar tongs?

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Save Girdled Trees

By F. E. F., Indiana

Thousands of fruit trees are girdled every year by mice and rabbits. Some are damaged to such an extent that there is no chance of recovery, while others are not appreciably injured. For those trees which are not completely ruined, what means can we use to save them? A regular fruit grower in Missouri says that by resorting to any of the following methods the trees may be saved:

First, if the injury extends only around a portion of the tree and is near the base, it will heal over in one or two seasons by banking up the soil around it. This should be done before the wood becomes dry. The soil should be piled about a foot high and pressed firmly about the base of the tree. In case the wound cannot be covered with soil it should be covered with soft grafting wax and wrapped with layers of burlap. New bark should soon form under the cover if the exposed surface has not become too dry. Trees completely girdled have been saved in this way.

Girdled trees can also be saved by sawing off below injury and cleft grafting the stub. If the stub is over an inch in diameter, two scions should be inserted. This will hasten the healing of the wound. From the scion inserted a strong tree will be developed in two or three years. Trees that have been saved in this way will come into bearing about as soon as others, not girdled, set at the same time.

Bridge Grafting

Another way to save trees, if the injury extends completely around the tree, is by bridge grafting. By this system, scions which have been cut to a wedge at each end, as for cleft grafting, are inserted in the live bark through openings cut above and below the wound. These scions will carry over the sap until the wound is covered. The scions should be about two inches apart. After setting the scions the parts are waxed and then everything is covered with burlap. This operation should be performed before the buds have started to swell.

A good wax to use for this kind of work is made of the following ingredients: One pound resin, one ounce tallow, eight ounces alcohol. To make this alcoholic wax, melt the resin and the tallow together. Then remove from the fire and add the alcohol, after allowing the liquid to cool somewhat. Stir until a thick paste is formed. In order to keep the wax in paste form it will be necessary to place it in covered receptacles.

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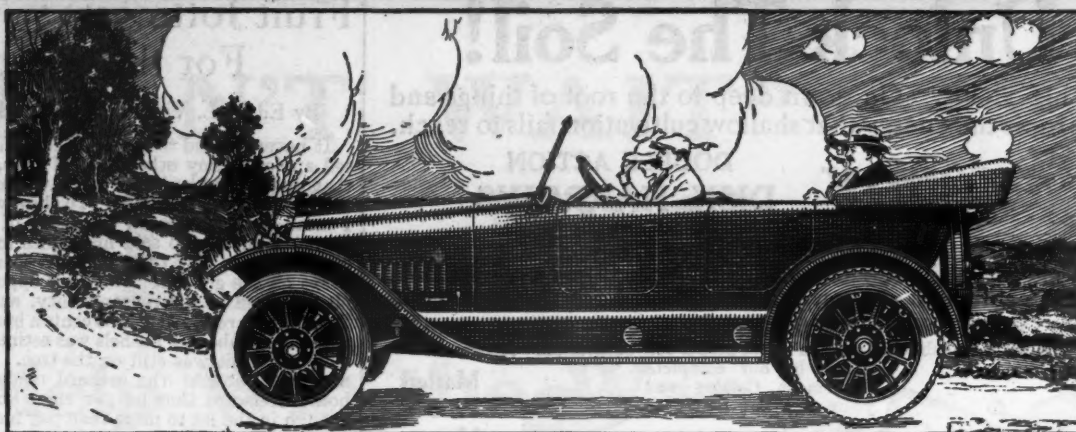
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Fruit Jottings For the Season

By Edgar L. Vincent, New York

It never seemed to me just the thing to sell apples or any other kind of fruit, for that matter, in the lump. It is too much like buying a pig in a poke. To show what I mean, let me pass on the story of one farmer I know who sold his apples in the orchard, he to pick them and pile them in heaps on the ground. There his opportunity, as well as his responsibility, ended. The price he received was 80 cents a bushel, and the number of bushels was estimated while the fruit was still on the tree. The man who bought the orchard made his boast afterward that he got cider apples enough in the lot to more than pay for the whole. Maybe, I am pretty conservative in such things, but I believe in a man's knowing about these things. At the best, we are not apt to get any too much for our fruit, but why give any man the whip over us in any such way? When we sell apples, let's know how many we dispose of and how much we are to receive for the same. Knowing beats guessing every time.

Fruit Needed for Health

We have had a pretty costly and striking example of the value of fruit as a means of preserving health in our own home. It happened a few years ago that we did not have much fruit in our own orchard, and it was scarce all around us, so that we did not use it to any extent, as we had formerly. It was not long before my wife began to be brown and bilious in appearance. At church she would be sluggish and drop to sleep easily. It seemed to be impossible for her to keep awake. In November of that year she was taken down with the worst form of rheumatism. For months she could scarcely bear the weight of the sheets of the bed upon her. It left her with a bad heart trouble and she came near losing her life. As soon as she could take it, we began to give her fruit, using oranges, grapefruit and good apples.

By being careful in other ways of her diet and taking medicine to help nature throw off the impurities with which her system was loaded, she began to improve. When we thought she was strong enough, she and I began to take walks in the open air. Little by little we lengthened these, especially taking many climbs up quite long, steep hills. From the start she improved, and today she is about as well as anybody of her age. But we have made up our minds that never again will we be out of fruit if there is any in the world. I am sure she would not have been sick if she had had fruit, and I know that the fruit is what keeps her well now. Since this experience, we have paid more attention to fruit growing than ever before, and I believe the man who gives the world a good supply of fruit is a real benefactor.

Keep Trees Headed Down

In our orchard we have a number of trees set out probably fifty years ago. Some of these have attained a height of thirty or forty feet. Picking apples in such trees is pretty hard work. Moving the ladders is particularly heavy business. I do not suppose there is now any way to remedy this matter. But this experience has settled one thing for us: we will not let any of our trees recently set out run away from us in any such way. By heading them down we can prevent their reaching the skies.

Cows in Orchard

How long ago our old orchard was set out I have no means of knowing. It was long before we bought the place. There used to be an old rail fence around it, but in the course of time it went down, so that the cattle pasturing nearby used to lie in it and eat a great deal of the fruit. One good thing came of this: the soil was always well fertilized, and for that reason, mainly, it always bore good fruit. Last fall we put a wire fence about the orchard, but we intend to let the cows lie in the inclosure all we can before the fruit comes on; for I am convinced that the droppings help to give us the fine crop we gather from those trees. I question whether most farmers fertilize their orchards as they should.

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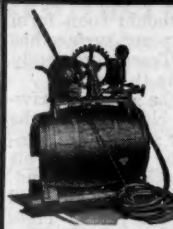


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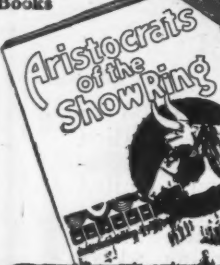
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By W. A. Greiner, Connecticut

I have often been tempted to sit down and express my opinion on different matters, but as I am well aware of my lack of ability to write I have held back until now.

It seems a pity to see such strong, healthy, hard-working men as are to be found on our farms, selling their cattle and homes and going to the city to work in the stuffy shops for from two to four dollars a day. They could make just as much, and perhaps more, on their farms, and at the same time help to solve the high cost of living problem.

Last fall there were several farmers who had potatoes, turnips and such root crops, frozen in the ground. Of course I will admit that they had, and still have, their troubles. A great many of them planted twice as much as usual, and besides good help was scarce. But because good, experienced help was scarce, that didn't offer any good reason for the farmers to have gotten discouraged and to let their crops spoil. There was plenty of inexperienced help to be had if they had taken the trouble to look for it. In times like these it is better to hire poor help, even if it be necessary to pay them more than they are worth, rather than to let the crops spoil in the ground, and lose the seed, the time and the work which was spent on them during the growing season.

Now let us consider the fuel situation as it stands at the present time. Coal is so scarce that the shops are being closed, and people are having the time of their lives trying to make ends meet, and wondering how they are to get more coal when their supply is exhausted.

Good Fuel Neglected

All this time there are cords and cords of wood lying rotting on the ground in the woods. People and factories would be willing to pay high for this wood if they could get it. Yet you would be surprised to find how indifferent most farmers are to this source of income. I remember talking to a man who has a large amount of woodland, and he is considered a very enterprising and successful farmer. Yet when I questioned him as to why he didn't cut this wood and sell it in the city for \$10.00 a cord, he looked at me a minute or so and said: "Well, friend, I suppose you mean well enough, but do you know that I can't get anybody to cut it for less than \$3.00 a cord?" I said: "Even at that price don't you think that by selling it for \$10.00 a cord you could still make a good profit on the wood? It is better to cut wood than to leave the horses idle in the barn. You have to feed them just the same." He replied: "That's true all right, but I never paid a man more than \$1.00 a cord and I don't intend to begin now." And the peculiar part of it is that a good many of them seem to regard it in the same light. Isn't there something we can do to open the farmer's eyes to this valuable income?

BUY FROM RELIABLE FIRMS

Some of the state colleges of agriculture are sending out circulars containing a list of nurserymen who have complied with the state law for the sale of nursery stock in that state. Everyone is urged to use this list when ordering orchard stock, and also asked to arrange for inspection of stock at the time of purchasing. In this way it is hoped to arrest the spread of many very injurious pests which are carried from place to place by the careless importation of nursery stock from localities where such pests exist.

It is surely worth while for the fruit grower to help in protecting himself against what may prove ruinous to his crops.

OLDEST NAVEL ORANGE DYING

The first tree to produce navel oranges in the United States came from Brazil and was planted in California in 1873. It is stated that this famous tree is parent to groves producing annually \$67,600,000 in choice fruit. Small wonder that when it was attacked by a mysterious disease which threatened its life, the most noted citrus experts of the world were called in to diagnose the case and, if might be, save the life of the noble veteran. Every effort is being made to find the cause and cure of the malady.

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IRON AGE Barrel Sprayer

(horizontal) solves the spraying problem for the busy farmer. Can be used in any wagon, cart or sled. Reliable, easy-working pump placed outside the barrel—prevents rusting—all parts easy to reach. 100 to 125 pounds pressure with two nozzles. 50 and 100 gallon sizes. We make a full line of sprayers. Write today for booklet.

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30,000 SOLD—FIFTH YEAR
More Comfortable, Healthful, Convenient
Eliminates the out-house, open vault and cess-pool, which are breeding places for germs. Have a warm, sanitary, odorless toilet right in your home. No going out in cold weather. A boon to invalids. Endorsed by State Boards of Health.

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The germs are killed by a chemical process in water in the container. Empty once a month. No more trouble to empty than a toilet. Closet absolutely guaranteed. Guarantee on file in the office of this publication. Ask for catalog and price. ROWE SANITARY MFG. CO. 5403 8th ST., BETHUN, Ark. Ask about the Mc-San Water Closet—Hot and Cold Running Water Without Plumbing.

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For Dry Feet—Saving—Comfort
Outwear several pairs of all-leather, rubber or wood sole boots or shoes. Rust-proof, water-proof, keep feet dry, warm, comfortable. For farm, railroad, factory or mine. Easy walking, no noise, fit fine. Removable friction tape easily replaced at small cost. take up wear, prevent slipping. Removable cushioned foot sole, best leather upper. GUARANTEED waterproof bottoms. Thousands of delighted users. Money back if not satisfied. Free catalog gives prices on all styles and heights.

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To Prove This Statement
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Mr. C. E. Brooks, Inventor of the Brooks Rupture Appliance, cured himself and his device has been relieving and curing others for over thirty years.

If you have tried everything else do not despair. Where others fail is where we have our greatest success. Send the attached coupon today and we will send you our illustrated book which shows the Brooks Appliance and which gives you prices and the names of many people who have tried it and are cured. It is instant relief when all others fail. Remember, there are no medicinal salves, no torturous steel harness, no obnoxious springs or pads. You are the sole judge of its merits. Fill out the free coupon and mail it now. It will be worth your time whether you buy the Brooks Appliance or not.

War Dept. Orders Brooks Rupture Appliance

For the past 9 years the United States Department of War has ordered Brooks Rupture Appliances. The Surgeon-General states that the examining surgeon "certified in each case that the Appliance was satisfactory." Here is a letter from a Grand Army man who says he was cured by the Brooks Appliance:

Mr. C. E. Brooks, Dear Sir:

"I suffered from rupture over 40 years. Was ruptured while in the army in 1864 and I had tried all kinds of trusses but found no relief until I tried your Appliance. I stopped wearing it about 3 years ago and I consider myself completely cured. Am 84 years of age and go about my work without any trouble." (Signed) Geo. B. Christison.

Stamford, Conn.

Is Your Truss a Torture?

Are you suffering the discomforts of a steel truss which burrows into the flesh and which painfully compresses the muscles and the nerves of the back? Here is a letter from a minister of the Gospel who suffered the tortures of a steel truss but found relief in the Brooks Appliance:

Mr. C. E. Brooks, Dear Sir:

"I had a rupture of eight months' standing. I still hesitated to tell our family physician about it, knowing he would recommend the wearing of a hard steel truss. At last I was so annoyed that I had to get such a truss and wore it for one month, under torture. I saw your advertisement in the 'Christian Herald,' sent for your Appliance, wore it for three months with much comfort and am glad to say I am cured." (Signed) Rev. David Kilhefner.

161 Church Ave., Ephrata, Pa.



Holcomb, N. Y.

hard steel truss. At last I was so annoyed that I had to get such a truss and wore it for one month, under torture. I saw your advertisement in the 'Christian Herald,' sent for your Appliance, wore it for three months with much comfort and am glad to say I am cured." (Signed) Rev. David Kilhefner.

Read How This Man Says He Was Cured Without Giving Up Hard Work

C. E. Brooks, Marshall, Mich.

Dear Sir:—"After wearing your Appliance three months I am glad to say my rupture is cured and I have been working every day plowing, drawing stone and other work upon my farm. Your Appliance is more than you claimed it to be, and \$25 would not be too much to ask for it. It certainly is a wonder. Two days after I had it I never knew I had it on. Water doesn't hurt it and if I keep it on this summer I will wear it swimming. If you wish to make this letter public you can and if any one doubts it, if they will write me and send a stamp I will cheerfully answer all questions. Thanking you for your kindness I remain, Yours truly, Archie Mason, Holcomb, Ont. Co., N. Y. Box 163."

Ruptured Child Deserves the Right to Play

The firm elastic band of the Brooks Rupture Appliance allows free, unhampered movement of the child's active little body. At the same time it surely and comfortably retains the rupture. The Automatic Air Cushion covers the ruptured spot and clings closely without chafing or slipping. Read what a grateful mother whose little boy was cured says:

Brooks Appliance Co.:

1030 Lime Street, Topeka, Kans.

"It has been over six years since I got your Appliance for my little son, then seven years of age. He was badly ruptured by a fall when he was 18 months old. We thought he would surely die. We tried many different common trusses and spent a great deal of money trying to get something he could wear with comfort. At one time our doctor expected to operate, while another specialist said the boy never could be cured. We put your Appliance on him. He wore it one year and although we then believed he was cured, we let him wear it six months more to be sure. Now he is strong and muscular, jumps, runs, kicks football, etc., is a member of the gymnasium class in the Y. M. C. A. and is as active as a boy can be." (Signed) Mrs. Carrie Ragsdale.



Send Free Coupon

Don't put this matter off another minute. Find a pencil or pen and ink, fill out the coupon now, tear it out and mail it to the Brooks Appliance Co. If your rupture is not serious and does not trouble you now it may in the near future. Be forehanded. The Brooks Appliance is the safe and sure relief. Foresight and action now may save you the pain, the danger, and the expense of an operation later on.

Trial Is Free! You Risk Nothing!

So certain are we of what the Brooks Appliance will do, and so earnest are we in our desire to relieve the sufferings of truss-tortured humanity, that we are willing to send the Brooks Appliance on free trial to every ruptured man, woman and child in this country, or the world. We have put the price so low that none need suffer longer. The coupon will bring you full particulars in a plain sealed envelope.

BROOKS APPLIANCE CO.

219B State Street

Marshall, Michigan

Ten Reasons Why You Should Send for Brooks Rupture Appliance

1. It is absolutely the only Appliance of the kind on the market today. In it are embodied the principles that inventors have sought after for years.
2. The Automatic Air Cushion for retaining the rupture cannot slip out of position.
3. Being of soft rubber it clings closely to the body, yet never chafes or irritates.
4. Unlike ordinary so-called pads used in other trusses, it is not cumbersome or ungainly.
5. It is small, soft and pliable and positively cannot be detected through the clothing.
6. The soft, elastic bands holding the Appliance do not give one the unpleasant sensation of wearing a harness.
7. There is nothing about it to get foul and when it becomes soiled it can be washed without injuring it in the least.
8. There are no metal springs in the Appliance to torture one by cutting and bruising the flesh.
9. All of the material of which the Appliance is made is of the very best that money can buy, therefore it is a durable and safe Appliance to wear.
10. Our reputation for honesty and fair dealing is so thoroughly established by an experience of over thirty years in dealing with the public, and our prices are so reasonable and terms so fair, that there certainly should be no hesitancy in sending free information coupon today.

Free Information Coupon

Brooks Appliance Co., 219B State St., Marshall, Mich.

Please send me by mail in a plain sealed envelope your illustrated book on "Rupture, Its Relief and Cure" and full information about the Brooks Rupture Appliance.

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Onion—White Portugal
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Sweet Corn—Golden Bantam
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Tomato—Chalk's Jewel
Turnip—Red or Purple Top Strap-Leaf

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